ON THE ACTION OF ADRENALIN IN THE INTESTINAL HAEMORRHAGE of TYPHOID FEVER.

Having had a number of deaths in cases of Typhoid Fever under my care at Monsall Hospital, Manchester, deaths which I considered to be due not so much to the fever per se as to the concomitant uncontrollable haemorrhage from the bowel, I was led to a consideration of the unsatisfactory methods of combating such haemorrhage at present in general use. From an experience of the local haemostatic effects of suprarenal extract, or the active principle thereof, in throat & nose surgery & with regard to its almost unfailing success in this special branch, I determined to try the effect of the drug by hypodermic administration in the next cases that occurred of intestinal haemorrhage requiring haemostatic treatment. In the following paper will be found my methods & the results which I obtained from clinical & experimental physiological work.

In addition to the work recorded in this short paper I made a macro- & microscopical study of the anatomy, histology, & morbid anatomy of the suprarenal glands, from a series of post mortem cases & hardened glands obtained from autopsies in fever cases & from cases of a general hospital, as a preliminary to the study of the nature of the suprarenal preparations, but, as this part does not bear directly on the cases which I intend to record, I have omitted it from my paper.

My paper is divided into two sections,

1/ The history, nature, & use of the suprarenal preparation

2/ Clinical notes with pathological findings in the cases in which I used adrenalin, with remarks on those cases & the conclusions derived therefrom.

Also a bibliography of the works referred to.

Physiology of the Suprarenal Glands.

That a certain group of clinical symptoms was accompanied by disease of the suprarenal glands was pointed out by Addison[4] in his paper. Brown-Sequard[16] was the first to investigate their function & his conclusions, although contradicted at one time, remain approximately correct. Tizzoni[54], from his work on the subject, concluded that, after removal of both suprarenal glands, the animals could not live, death being due to the absence of the glands & not to the operative injury; post mortem he found extensive alterations in the brain, spinal cord, & peripheral nerves. Abelous & Langlois[3] found that removal of one suprarenal gland gave rise to no special symptoms &, after removal of both, that death could be delayed, but not averted, by injections of suprarenal extract. Szymonowicz[50] corroborates these results. With regard to the physiological role of the suprarenal glands there are three possible lines of observation. Observation

1/ Of animals after removal of one or both glands,

2/ Of animals after injection of extracts of the glands,

3/ Of the chemical constituents of the glands.

The results obtained from the first method are, briefly, as follows. Pigment develops in the skin & mucous membranes of those animals from which both suprarenal glands have been removed & they become very weak & emaciated; disturbances of the nervous system, such as epileptic convulsions; delirium, & vertigo are also present. Death eventually occurs from paralysis of the respiratory muscles. If only one gland be removed the muscular manifestations, if they occur, are more marked on the corresponding side. In animals dying soon after ~~p~~ operation the alterations in the nervous system producing these symptoms differ from those in animals surviving for some months. In the first group the alterations ~~in~~ ~~this~~ are due to haemorrhages scattered through the central nervous system; in the second group the changes are primarily independent of the circulatory disturbance. They include degeneration of the posterior columns & posterior nerve roots & atrophy of the posterior cornua. In the medulla the nuclei of the glosso-pharyngeal & vagus nerves are atrophied. Tizzoni[54] found degeneration of the coeliac & mesenteric plexuses of the sympathetic & he believes that the changes begin in the abdominal sympathetic plexuses & affect the central nervous system

through the ganglionated cord. Loss of appetite was noted, also increased peristalsis & diarrhoea. (Nothnagel,[43] Tizzoni[54]). Jacoby[32] states that the suprarenals contain an inhibitory centre for peristalsis, he having observed that an irritable condition of the intestine was produced on stimulating the vagus of animals from which the glands had been removed. The changes in the blood are mainly chemical & appear gradually, the only immediate result after the removal of the glands being a great fall in the blood pressure. Strehl & Weiss[51] show that, if the one suprarenal gland has been removed, ligature of the vein from the other causes a fall in the blood pressure; on removing the ligature the blood pressure again rises. With regard to the second method of observation, that of injection of suprarenal extracts, Foa & Pellacani[22] first undertook the work & found that symptoms of poisoning resulted, these symptoms being impairment of sensation & reflexes & subsequent general paralysis. Guarneri & Marino Zucco,[26] in later work, considered that these poisonous properties were due to neurin & organic phosphoric acids but Oliver & Schafer[44] contradict this, they having found, as a result of their experiments , an enormous rise of blood pressure, noting at the same time that neurin, as a rule, caused a fall. This rise they say

is caused by the direct action of the suprarenal extract on the muscular fibres of the smaller arteries, especially those of the splanchnic area, causing a ~~cpt~~ contraction of these vessels. They also state that another effect of the extract is to slow & strengthen the heart's beats; they find that it has no constant effect on respiration. Szymonowicz[50] comes to somewhat similar conclusions but further states that large dases cause cardiac arrhythmia & paralysis of respiration, small doses, however, stimulate the respiratory centre. Owing to the fact that the active principle of the extract is readily oxidized its action is transient. The chemical experiments of Sigmund Fraenkel culminated in the isolation by him of the active principle of the suprarenal glands in the form of a brown, syrupy, non-crystallisable, substance, readily soluble in water & alcohol; this substance, to which he gave the name Sphygmogenin, is easily rendered physiologically inert by exposure to light, air, or prolonged boiling. The active principle was next, in 1898, isolated, in the form of a benzoate, by Abel[1]; to this substance he gave the name Epinephrin. Von Furth[23] then isolated an iron compound from the glands which he called Suprarenin & claimed as the active principle, this, however, was proved to be the same substance as epinephrin. The latter when injected into the circulation produces a marked rise of blood pressure, its effect on respiration is at first to stimulate & later to paralize. Takamine[53] has more recently isolated a substance

which he has called Adrenalin & claims as the active principle of the gland; Aldrich[5] has confirmed his work. For details as to the method of isolating these compounds reference must be made to the original papers. Abel & Von Furth both give their methods in detail, Takamine, however, merely states that after considerable work on the subject he has isolated a substance differing from these other two; he makes absolutely no mention of his methods.

With regard to the physiological action of the Adrenalin, Miles & Muhlberg[40] at the end of 1902 published an account of an extensive research carried on by them as to its action as a stimulant & came practically to the same conclusions regarding this preparation as had Oliver & Schafer[44] with regard to aqueous & alcoholic extracts of suprarenal glands, viz. The administration of the drug is followed by an immediate rise of blood pressure due to its direct action on the muscular fibres of the vessels stimulating them to contract, while, at the same time, the beats of the heart are slowed & strengthened, the latter effects being due to vagus stimulation. Meltzer & Auer[39] state that adrenalin delays both absorption & elimination. No mention is made of an anti-peristaltic action, but, it occurred to me that, if the drug acted on unstriped muscle in one place, it would also

do so in another, & I will record later the result of a number of experiments which I performed with a view to eliciting this question.

A short account of the range of the use of Adrenalin will not be out of place here. It has been used with a large modicum of success, as a haemostatic agent, in many branches of medicine & surgery by various workers. Its greatest success has been, undoubtedly, as a local haemostatic in the special branches of surgery such as eye, ear, throat, & nose. In diseases of the ear, when the Eustachian tube is constricted by acute or chronic catarrh, introduction of the catheter is greatly facilitated by the application of adrenalin to the inner end of the tube. (Reynolds)[46]. Hartmann[29] has used the drug, with success in cases of tinnitus, by Eustachian injection into the middle ear. By its vaso-constrictor action it is useful in reducing the size of aural polypi &, by its haemostatic action, it is efficacious in obtaining an almost bloodless field & thus allowing a clear view of the part under operation. (M'Kernon)[38]. By its energetic constriction of the vessels in the mucous membrane adrenalin facilitates examination of the nasal cavities, especially the middle meatus. It relieves inflammatory congestion of the nasal mucous membrane & by so doing quickly lessens & abates the constant watery discharge of an acute rhinitis. Another use of

the drug is in relieving epistaxis, (M'Kenzie,[37]). Solis-Cohen[49] used it with great relief in hay fever. In the treatment of scarlatinal angina a spray of adrenalin is said to lessen the absorption of septic material from the fauces, (Burnet),[18] personally, however, I have not been able to satisfy myself that cases so treated have run a less sapraemic course than those in which the drug has not been used. The greatest benefit from adrenalin has been obtained in diseases of the eye. In acute conjunctivitis a weak solution is successful in alleviating the congestion & irritation consequent on the condition. (Bates[10]). When the eye is intensely inflamed & congested owing to the presence of a foreign body, a few drops of adrenalin solution blanches the conjunctiva & enables the surgeon to see clearly & extract the irritant particle. Its haemostatic action is useful in such operations as those for cataract, strabismus, pterygium. An anodyne action is apparent when the drug is applied in some cases of keratitis, iritis, & cyclitis. Lastly it enhances the action of drugs, such as cocaine, atropine, eserine, & pilocarpine, so doing by delaying absorption into the general blood stream. (Barker[8]).

In general surgery adrenalin is applied chiefly as a local haemostatic, being much used in genito-urinary surgery to relieve urethral & vesical haemorrhages & also urethral congestion; in the latter case to facilitate the passage of

urethral instruments in such cases as stricture or prostatic engorgement. Bates[10] states that it is also of value in acute or chronic gonorrhoeal urethritis. Gualdrini[25] uses adrenalin as a haemostatic in hepatic surgery. Using the drug in conjunction with cocaine or eucaine to produce local anaesthesia Elsberg[20] is convinced that it has a distinct value in minor operative surgery in that it prolongs the action of the anaesthetic & prevents haemorrhage except from the larger vessels, at the same time its stimulant action on the heart mitigates any depressing effect that the anaesthetic may produce. (Braun)[16]. Instances of the use of adrenalin as a local styptic could be indefinitely multiplied but no clear object appears in so doing. In general medicine adrenalin has been used in the treatment of internal haemorrhage of almost every kind. With regard to pulmonary haemoptisis; favourable notices of adrenalin treatment appear from time to time, (Hedley,[30] Bird,[12] Bowen,[14] Burke,[17]) but, similarly, unfavourable notices also appear, (M'Donald,[35] Duncanson,[19]) the latter quoting Dixon who states in an address delivered before the Therapeutical Society, in December 1903, that adrenalin not only fails experimentally to produce a contraction, but even causes a decided dilatation of the pulmonary vessels. In the case of the gastro-intestinal tract the haemorrhage may almost always be controlled when the drug can be applied locally, as with gastric (Benedict)[11] or rectal (Blair[13]) haemorrhages;

in the small intestine, however, where local application is impracticable, success is not so frequent although, in these cases, the results obtained are sufficiently encouraging to warrant its further use. Holt[31] cured a case of gastro-intestinal haemorrhage, occurring in a new born infant, by adrenalin & M'Donough[36] records a case of traumatic intestinal haemorrhage similarly cured. The stimulant & tonic action of the drug has been utilised frequently in cases of cardiac failure from various causes. (Myrtle[42], Harrison[29],). Quite lately Barr[9] published a paper in which he showed that he had put adrenalin to a new use, viz. that of preventing the re-accumulation of serous fluid, by injecting the drug into the cavity after drawing off the effusion.

With regard to the action of the drug on peristalsis, I undertook, while in Germany some months ago, a number of experiments on frogs, rats, & rabbits. The method of procedure was the same in every case, the animals were first anaesthetised with chloroform & the anaesthesia continued with ether, the abdomen was then opened & the condition of the bowel, with regard to peristalsis, was noted. Hypodermic injections of adrenalin were then made & the effect noted. The effect in all the cases, except one, was, that after a latent period varying from one to two minutes (in frogs it was less than

one minute) a slight increase in peristalsis was seen, but this, almost as soon as it appeared, passed off & the bowel became absolutely quiescent, this latter state lasted about five minutes, in one case as long as nine minutes. The case excepted above was that of a large rabbit in which, although it greatly diminished in activity, the peristalsis did not entirely cease. In every case the direct application of the drug to the exposed bowel caused an absolute cessation of movement at the point of application & for about half an inch on either side of it. The experiments were controlled by using injections of normal saline solution alternately with those of adrenalin. With the idea of testing the relative strengths of Armour's, & Parke, Davis's preparations, I had provided myself with both & found that, although the effects of both were similar, the effects of Parke, Davis's preparation appeared quicker & were stronger & more lasting. The method of comparing the two preparations was as follows; after the effect of an injection of the one drug had passed off, a similar amount of the other was injected, on a subsequent animal the sequence was reversed; investigating the direct action, two portions of bowel at a distance from eachother were chosen & the drugs dropped upon them. The fact that the drug also possesses an anti-peristaltic action greatly enhances its value in cases of typhoid haemorrhage.

Considering as I did that suprarenal extract in some form might be of use in combating intestinal haemorrhage in typhoid fever, there only remained the choice of the particular preparation. The preparation that I chose to use was Takamine's Adrenalin as supplied by Parke, Davis, & Co. , & whenever "Adrenalin" is referred to hereafter, the term means Sol. Adrenalin Chloride 1-1000, Parke, Davis, & Co.. The alternative to this preparation was Armour & Co's Suprarenalin Solution 1-1000, which, as far as I have been able to ascertain, is made from Abel's formula; on this point, however, I have no definite information. My reasons for adopting the former preparation were two; firstly I had used it with success as a local haemostatic in throat & nose surgery; secondly, it was on the market in a very convenient form, being stable & sterile, & therefore eminently suited for hypodermic injection in a class of case which, even in a large hospital is not of very frequent occurrence.

Laurence Cocker, aet.27

Compositor.

The patient was admitted on Nov.11th 1903, complaining of headache & abdominal pain of about ten days duration.

On Nov.1st the patient had a headache & a "sore throat"; later on in the day he began to experience abdominal pain also; the following day he had an attack of shivering and some diarrhoea. From that time the diarrhoea recurred at intervals & he remained in bed. A specimen of his blood having given a positive reaction with Widal's test, his doctor advised his removal to hospital.

On admission the patient's face was somewhat flushed & he was perspiring freely; his pulse, which was soft and full, & regular in force & rhythm, numbered 108 per minute; his temperature was 103.2°; his tongue was moist & clean. Examination of his chest revealed no abnormality in the lungs; the heart, excepting a slight softness of the first sound at the apex, also appeared quite normal. The abdomen, on which no rose spots were seen, was slightly distended, and was tympanitic to percussion. The liver dulness extended, in the nipple line, from the upper border of the fifth rib to the costal margin. There was no appreciable splenic enlargement.

On the day after admission -the 12th-, the spleen was palpable on deepest inspiration only. On the 14th a rigor & a rise of temperature occurred, many rose spots were seen on the chest and abdomen, and the patient did not seem so well.

Examination of his chest showed the presence of slight dulness at the left base, with a few crepitant rales & slight prolongation of expiration. On the morning of the 16th considerable abdominal distension was relieved after the administration of a turpentine enema; the resulting stool contained a few streaks of bright blood. With the exception of a moderate degree of generalised bronchial rhonchi, there was no great change in the lung condition. The following day, however, his general condition was not so satisfactory, his tongue was very dry & furred, his pulse small, rapid & feeble; well marked dulness was present at the base of the left lung behind, reaching round into the axilla & to within an inch below the angle of the scapula; over this area, although there was no definite tubularity, the breath sounds were accompanied by numerous crepitant rales. On the morning of the 18th there was another slight rigor, but the temperature did not show any further rise, during the day, there was, indeed, a steady fall &, towards night, in three stools, the patient passed bright red blood in quantities of Oz6, Oz 8, & Oz 4. During the night he again passed three motions containing blood, (Oz6-Oz8-Oz10), After the last motion (about 5.30A.M.) he was given Adrenalin sol. M7 hypodermically, there was no appreciable effect on the pulse, which continued rapid, thready, & uncountable. He remained in this condition during the day but, towards noon on the 20th the pulse had improved in volume and was not so rapid, (numbering 90 per minute), and altogether his condition seemed slightly

improved. The bowels moved during the ~~day~~ evening, the motion being dark & containing one or two blood clots but no fresh blood. Unfortunately the improvement noted above ~~day~~ soon ceased & was followed by slowly increasing decline as evening drew into night. Despite stimulation & a saline infusion the patient sank & died about six o'clock on the following morning (21st).

General Register No.

DISEASE.

Name Laurence Locker

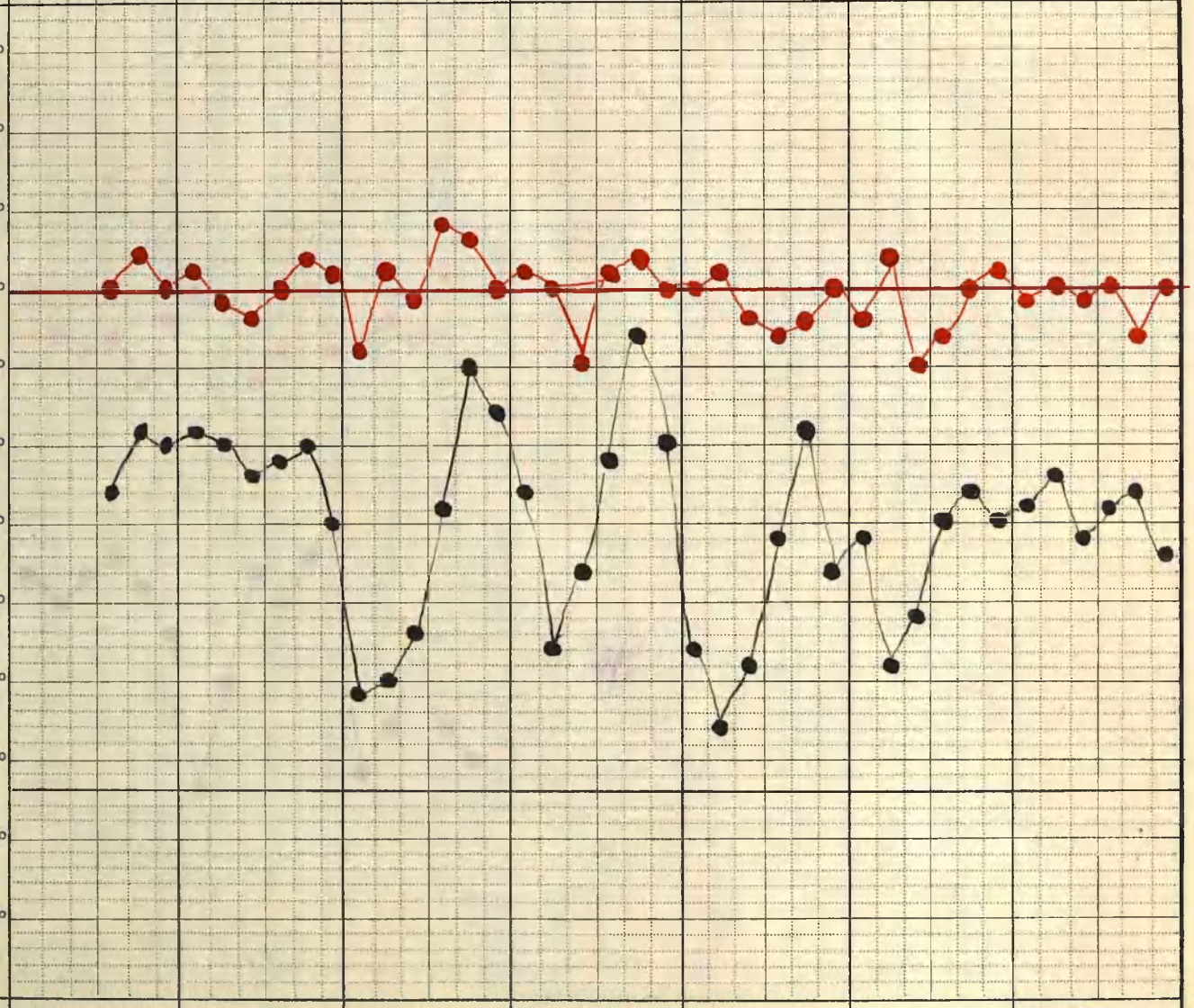
Age 24 Date of Admission Nov. 11th 1903

Diet & Treatment

Result

Date	Nov. 11	12	13	14	15	16	17
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°



Bowels							
Urine							

General Register No.

DISEASE.

Name Laurence Locker

Age Date of Admission

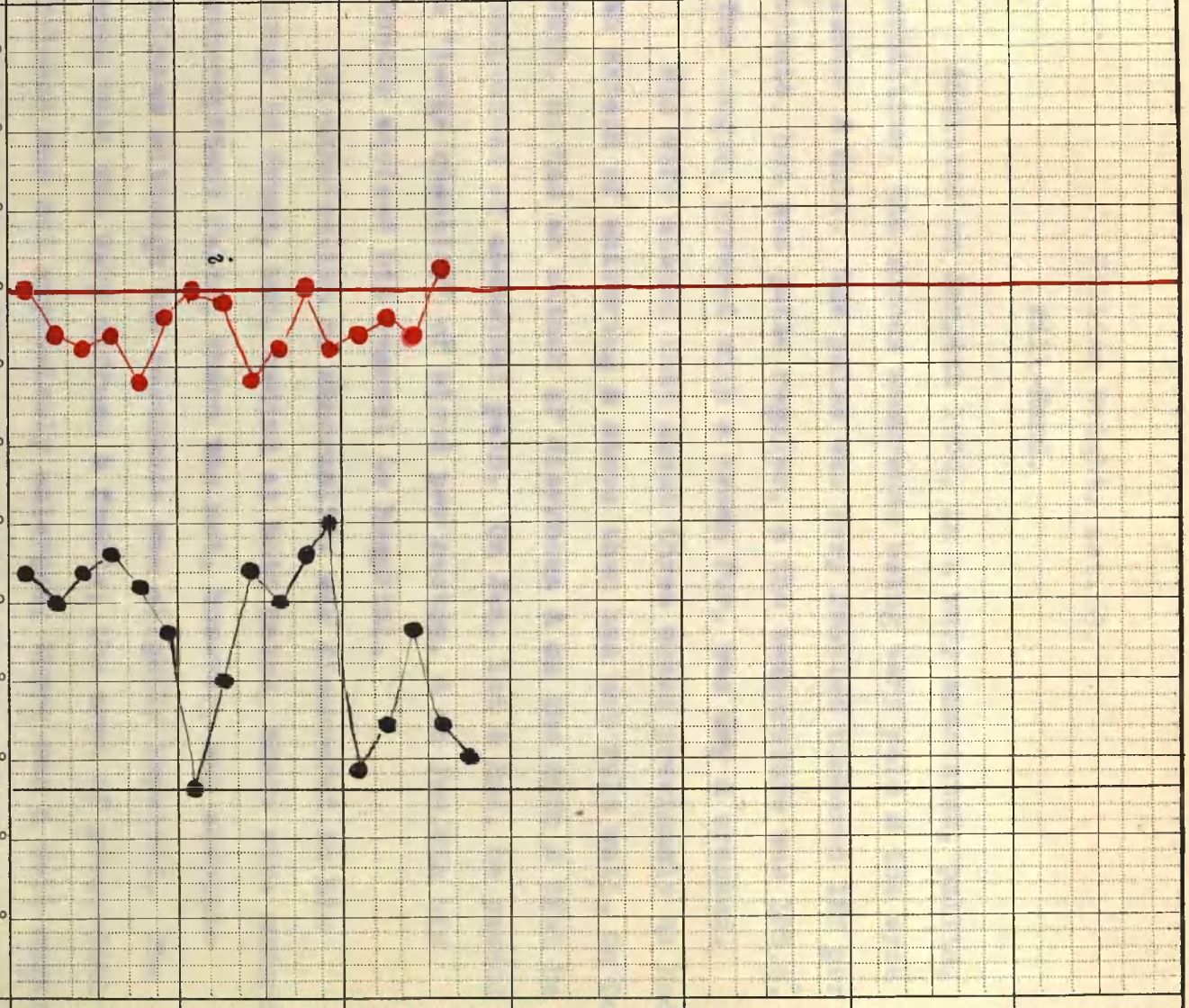
Diet & Treatment

Result

Date	18	19	20	21	22	23	24
Day of Disease							
Pulse							
Respiration							

Time: A.M / P.M — 2 6 10 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80 NORMAL TEMPERATURE OF BODY.	99°
15	70	98°
10	60	97°



Bowels

Urine

William Wright, aet.26.

Mill-Hand.

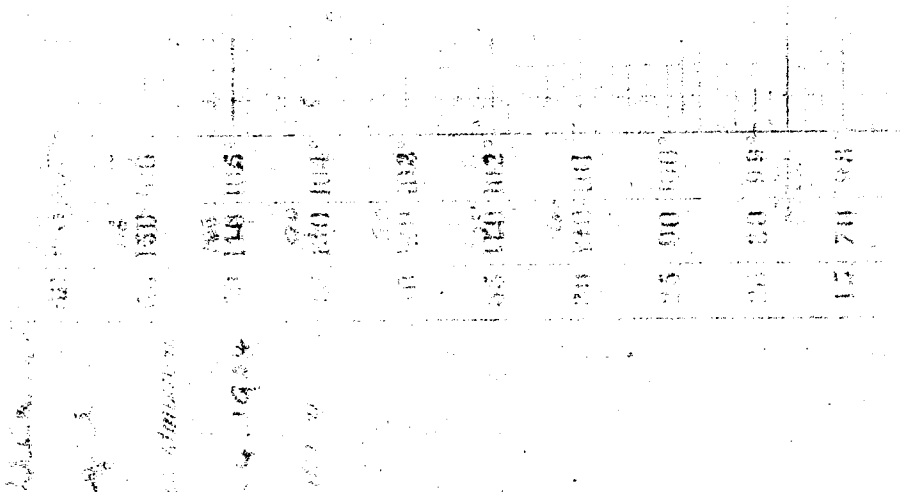
Admitted on Jan.4th 1904, in a very emaciated, pallid, condition, the mucous membranes being very pale & the eyes sunken & dull. The pulse was very feeble & numbered 122 per minute, but was quite regular, & the temperature was 103.8°. The tongue, covered with a brown fur, was dry & cracked.

His wife stated that about three weeks previously he had an attack of shivering & since then had not felt well. On Dec. 28th, he had an attack of diarrhoea & on the 30th & 31st he conplained of abdominal pain. On Jan. 1st & 2nd, he passed a "large quantity" of blood per rectum, & on Jan.4th his doctor advised his removal to hospital.

On examination no abnormality was discovered in his lungs in front, but, behind at both bases, there were numerous subcrepitant rales; there was not, however, any absolute dulness although the resonance was slightly impaired. The apex beat was very diffuse & feeble; the area of precordial dulness was not appreciably enlarged; there was a well marked systolic murmur audible over practically the whole precordial area. There was slight abdominal distension; the liver dulness extended, in the nipple line, from a point one & a half inches below the nipple, to the costal margin. The spleen was not appreciably enlarged on percussion nor was it palpable. Rose spots were present over the abdomen.

At 9.45 P.M. some five hours after admission, the patient passed per rectum about Oz 15 of fairly bright, unclotted

blood. He was then given Adrenalin MX hypodermically &, as he was somewhat restless, Morphia Gr.¼ was also given; no appreciable ef-fect on the pulse was felt with the fingers on the radial artery; unfortunately a sphygmographic tracing was not taken. He passed a very comfortable night &, next morning, seemed at anyrate no worse. During the day, however, he gradually became weaker &, early on the morning of the 6th, he died. Before death the bowels moved but the motion, although containing one or two blood clots, contained no fresh blood. There was no drop in the temperature nor was there any other symptom present to suggest the occurrence of any further haemorrhage. A post-mortem examination was refused.



General Register No.

DISEASE.

Name William Wright

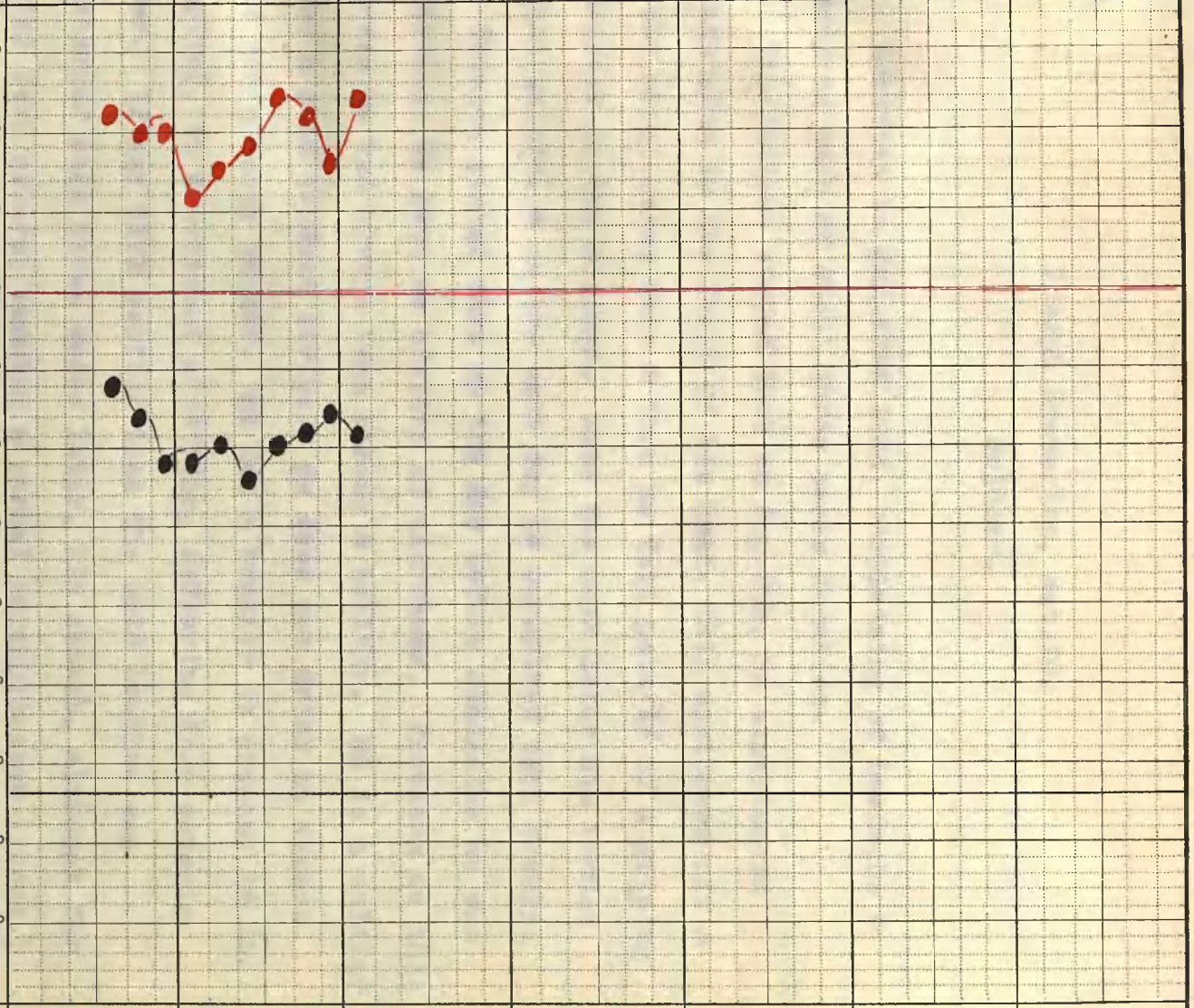
Age 2½ Date of Admission Jan 4. 1904

Diet & Treatment

Result

Date	4						5						6						7						8						9						10					
Day of Disease																																										
Pulse																																										
Respiration																																										
Time	A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	0	2	6	10	2	6	10	2	6	10	2	6	10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°



Bowels

Urine

/3/

Joseph Brewerton, aet.20.

Soldier.

Admitted on Jan.22nd,1904, complaining of headache & abdominal pain of about three weeks duration.

The patient stated that on Jan.8th, he experienced severe pain in the front of his head, this continued off & on for about seven days & then he felt pain of a griping character in the abdomen. Some few days later his throat became painful & on the next day he perspired very freely. His friends stated that on the day before admission he was delirious. He gave no history of diarrhoea. Previous to this illness he had always been strong & healthy. He is a soldier & has a good conduct stripe. He does not drink to excess & is not a heavy smoker. He has a brother at present in the hospital, in a critical condition, suffering from enteric fever. (I may here mention that the said brother was discharged some three weeks later, his attack, although for a time very severe, running a normal uncomplicated course.)

On admission the patient was a strong, very well developed lad, he lay comfortably on his back, & did not seem seriously ill; his temperature was 102.6°.& his pulse, which was strong, of fair tension, & quite regular, numbered 88 per minute. His tongue was covered with a white fur, was moist & not tremulous; his mouth was clean, except for a little muco-purulent exudation on the back of the pharynx, the latter being elsewhere visibly congested. There was no external

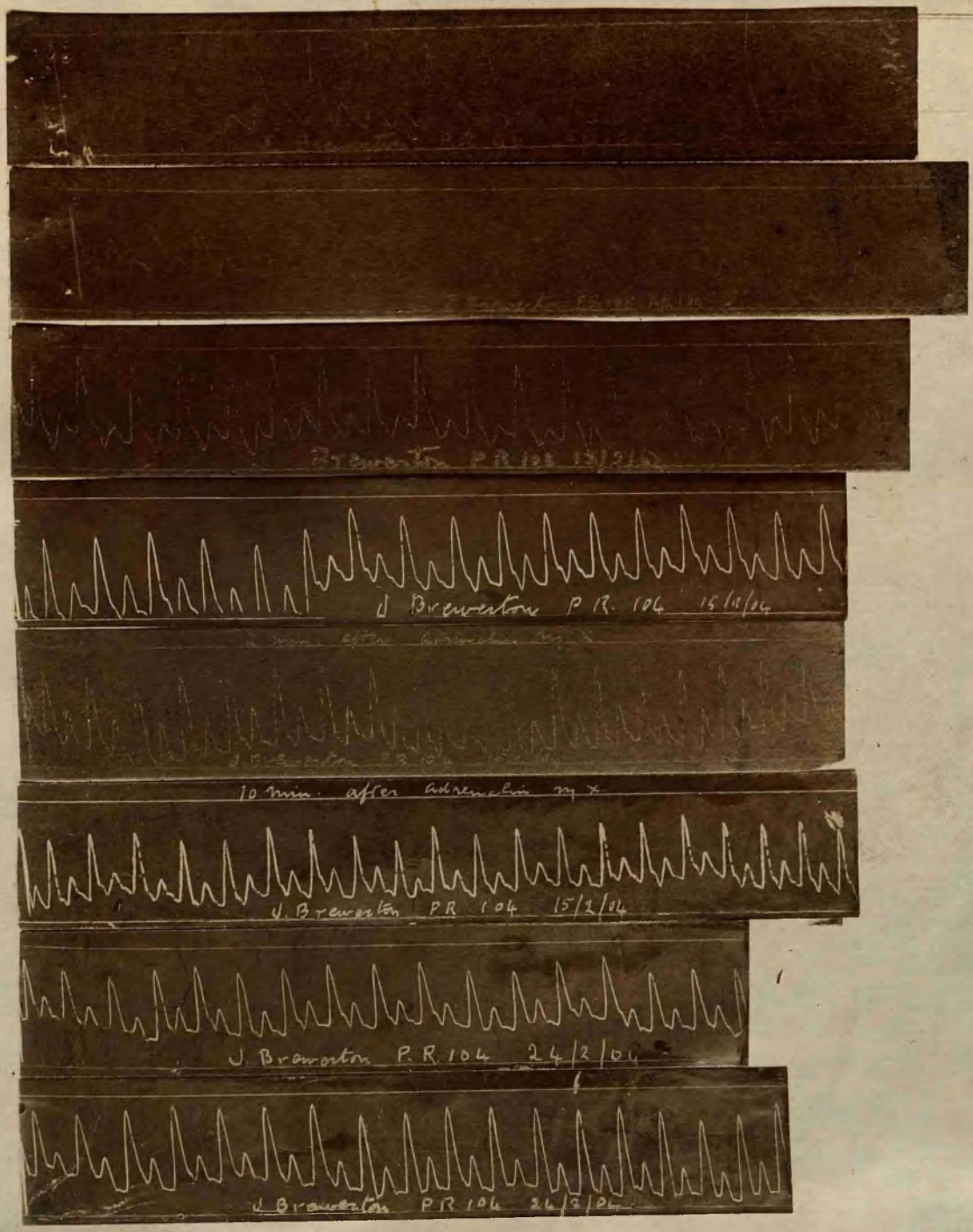
glandular swelling in the neck. No rose spots were noted, No abnormality was detected in the lungs; there was no increase in the area of precordial dulness; the apex beat was in the fifth intercostal space about half an inch inside the nipple line. Auscultation over the mitral area showed the presence of a soft systolic murmur, otherwise no abnormality was detected. The abdomen was slightly distended but not tender, the well developed abdominal muscles prevented the acquisition of any further information by palpation: on percussion a tympanitic note was obtained all over. The liver dulness extended from the level of the sixth rib, in the nipple line, to a line drawn one inch below the costal margin. The urine showed no variation from the normal.

By the end of the first week of residence the patient's throat became quite well under suitable treatment & he seemed to be progressing favourably. On the eighth day, however, he passed an undigested motion & his temperature, which had been swinging about between 99° & 101°, began to go steadily up & reached its maximum (104.2°) five days later. So far there had been no haemorrhage nor any other adverse symptom & the patient looked wonderfully well. On Feb. 5th the patient passed some blood clot &, during the next four days, was troubled with fairly severe diarrhoea & rapidly lost ground. On the night of the 9th, while the nurse was away, the patient, who was now somewhat delirious, got up out of bed; shortly after this he passed about 0zI of bright blood & this occurred

again some four hours later, the quantity again being about OzI. The diarrhoea had now ceased. The following day Oz7 of dark blood were passed. Blood continued to be passed in slight amounts until the evening of the I4th when OzI2 of bright blood were passed &, early on the following morning, Oz6 of darker blood appeared. His pulse remained regular but of low tension. Up to this time endeavour had been made to check the haemorrhage with morphia, without, apparently, any very great effect. On the evening of the I5th, the patient again managed to get out of bed &, very shortly after this, he passed Oz24 of bright blood; his temperature had taken a sudden drop his pulse had become very rapid & weak & his condition seemed very critical. He was then given Adrenalin MX hypodermically. There was no appreciable effect noted on his pulse either by the fingers or by sphygmograph. The patient had a fairly quiet & comfortable night &, next morning, passed about OzI2 of old & partly clotted blood. His pulse was still of very low tension but not so feeble & rapid. After the Adrenalin administration there was absolutely no more haemorrhage & the patient's convalescence was slow but sure, the temperature beginning to come down some five days later.

After the patient had been up & walking about for about eight days his temperature again went up & remained between IOI° & I02° for five days, coming slowly down to normal in another five. Except the rise of temperature, there were

no signs of a relapse present. He was again allowed up & remained well until his discharge on April 15th, 1904.


J Brewerton P R. 104 15/2/04
10 min. after adrenalin 1 in 1000
J. Brewerton P R 104 15/2/04
J. Brewerton P.R 104 24/2/04
J Brewerton P R 104 24/2/04

General Register No. .....

DISEASE.

Name Joseph Brewerton

Age 20 Date of Admission Jan. 22nd

Diet & Treatment

Result .....

Date	22						23						24						25						26						27						28					
Day of Disease																																								
Pulse																																								
Respiration																																								
Time	A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°

Bowels

Urine

General Register No.

DISEASE.

Name Joseph Brewerton

Age Date of Admission

Diet & Treatment

Result

| | | |

General Register No.

DISEASE.

Name Joseph Brewerton

Age Date of Admission

Diet & Treatment

Result

Date	12	13	14	15	16	17	18
Day of Disease							
Pulse							
Respiration							

Time: A.M 2 6 10 | P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80	99° NORMAL TEMPERATURE OF BODY.
15	70	98°
10	60	97°

Bowels

Urine

General Register No.

DISEASE.

Name Joseph Brewerton

Age Date of Admission

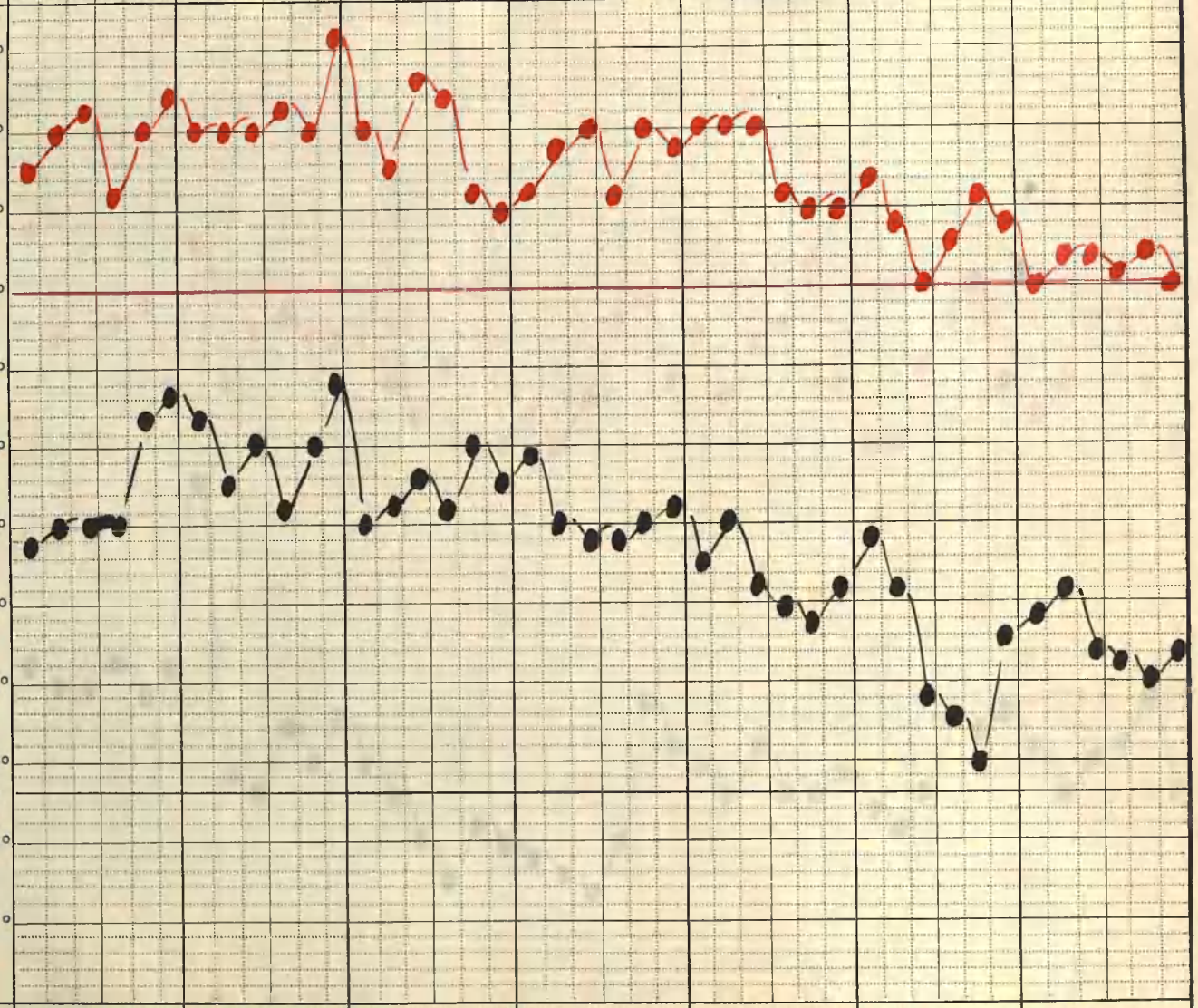
Diet & Treatment

Result

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
15	70	98°
10	60	97°

NORMAL TEMPERATURE OF BODY.

Date	19	20	21	22	23	24	25
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10
Bowels							
Urine							



General Register No. .....

DISEASE.

Name Joseph Brewerton

Age ..... Date of Admission .....

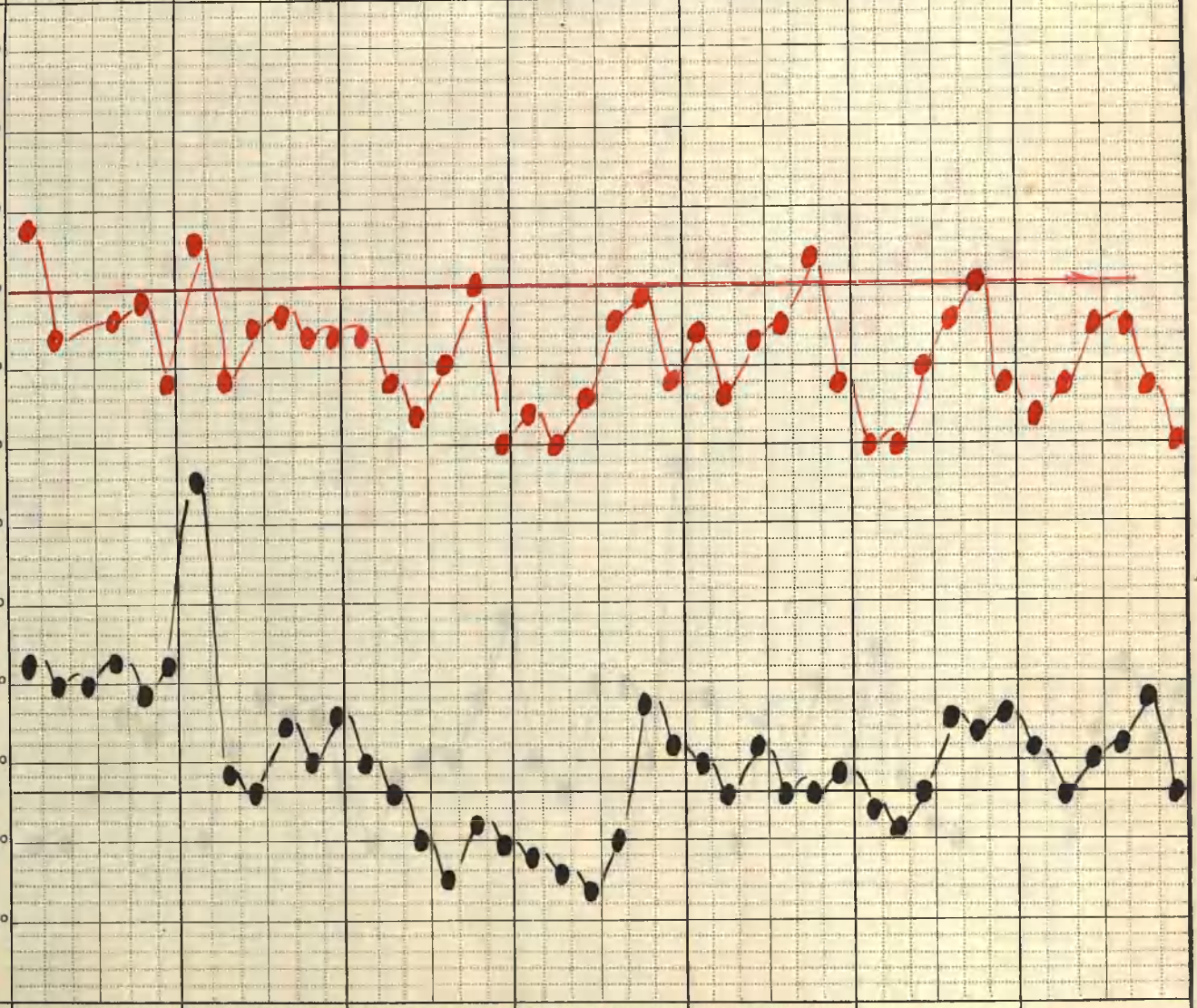
Diet & Treatment

Result .....

Date	26	27	28	29	Mar. 1.	2.	3
Day of Disease							
Pulse							
Respiration							

Time: A.M 2 6 10 | P.M 2 6 10 (repeated for each day)

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80 NORMAL TEMPERATURE OF BODY.	99°
15	70	98°
10	60	97°



Bowels

Urine

General Register No.

DISEASE.

Name Joseph Brewerton

Age Date of Admission

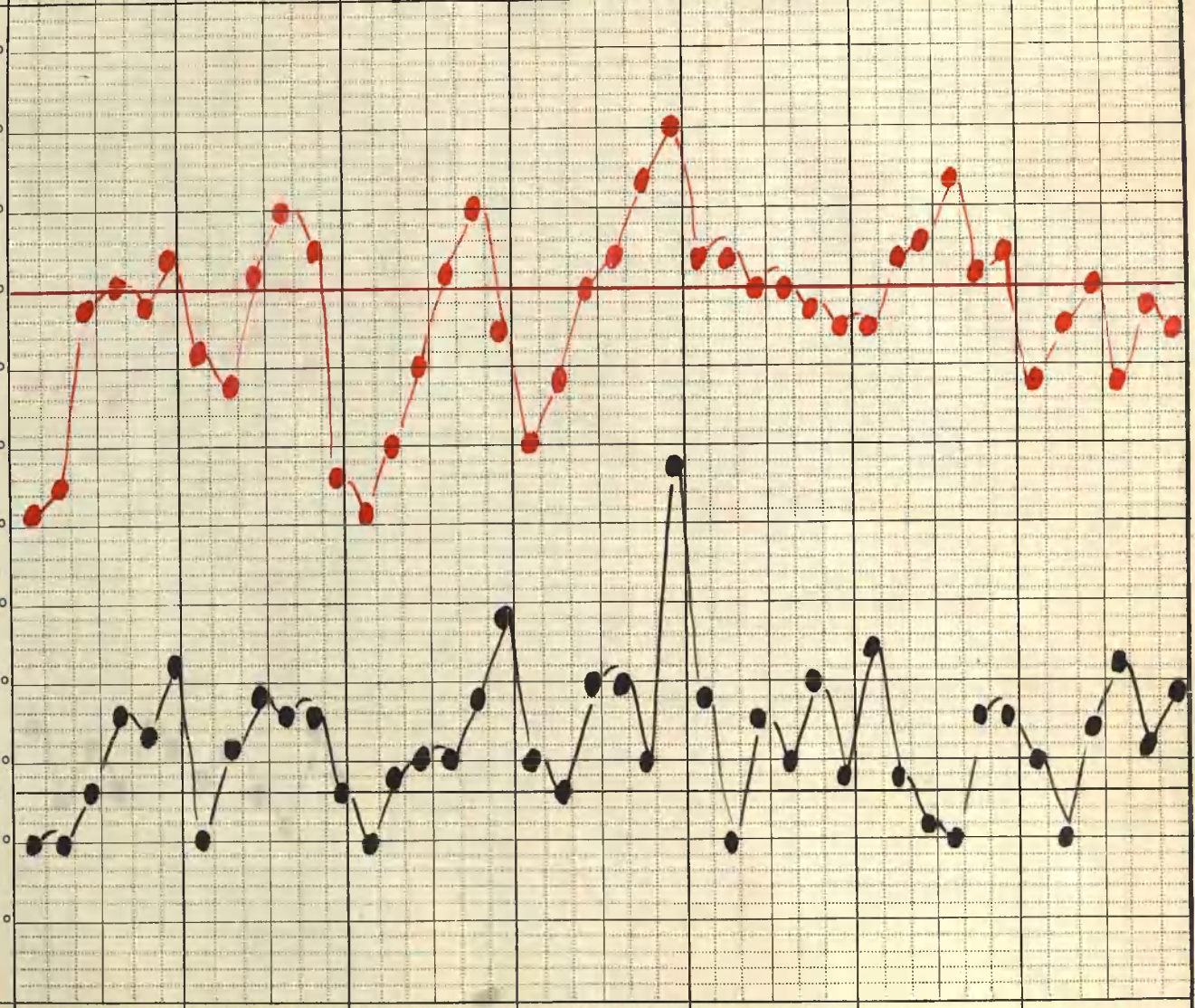
Diet & Treatment

Result

Date	4	5	6	7	8	9	10
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80	99°
15	70	98°
10	60	97°

NORMAL TEMPERATURE OF BODY.



Bowels

Urine

General Register No.

DISEASE.

Name Joseph Brewerton

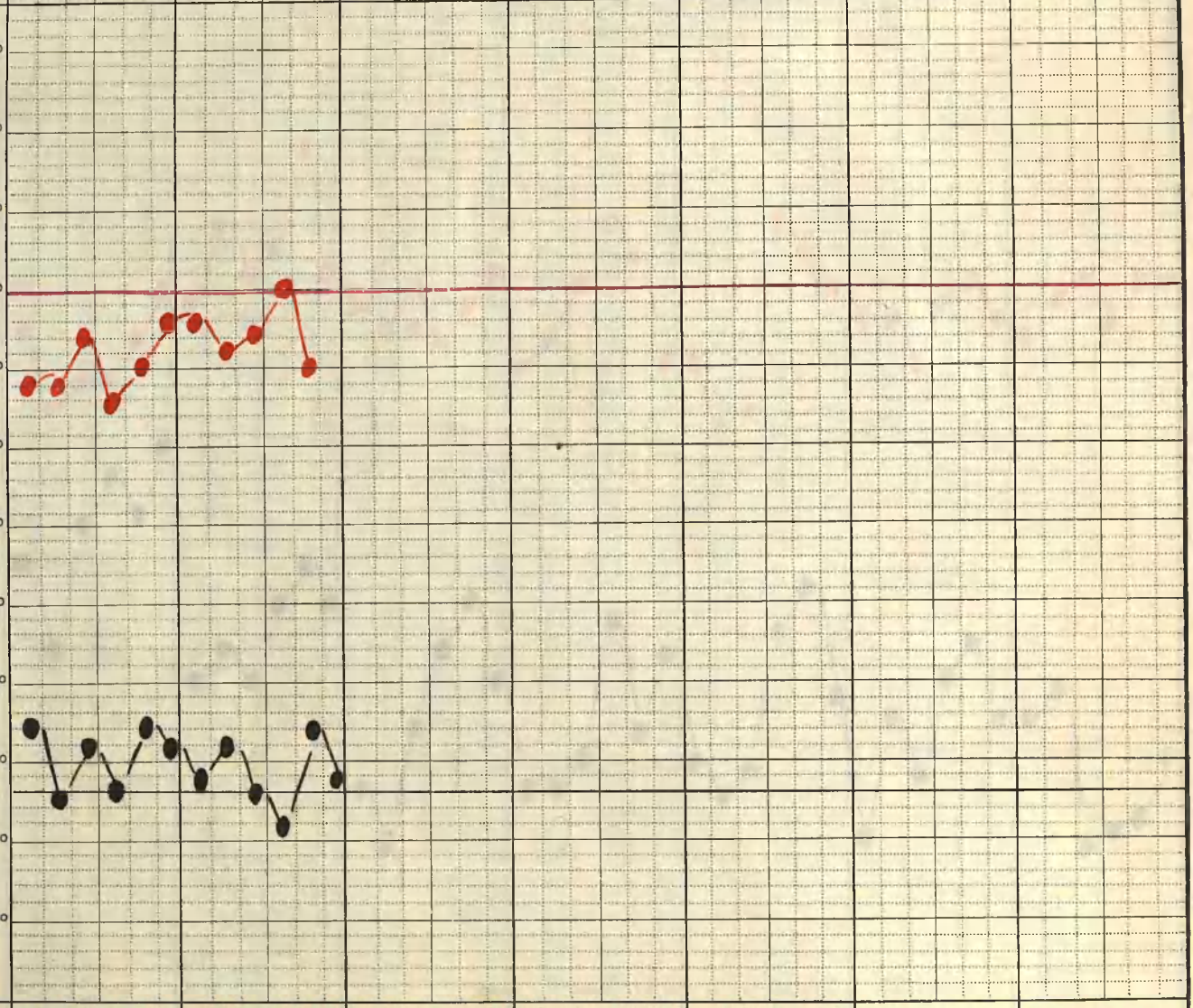
Age Date of Admission

Diet & Treatment

Result

Date	11	12	13	14	15	16	17
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	110	102°
30	100	101°
25	90	100°
20	80 NORMAL TEMPERATURE OF BODY.	99°
15	70	98°
10	60	97°



Bowels

Urine

General Register No.

DISEASE.

Name Joseph Brewerton

Age Date of Admission

Diet & Treatment

Result

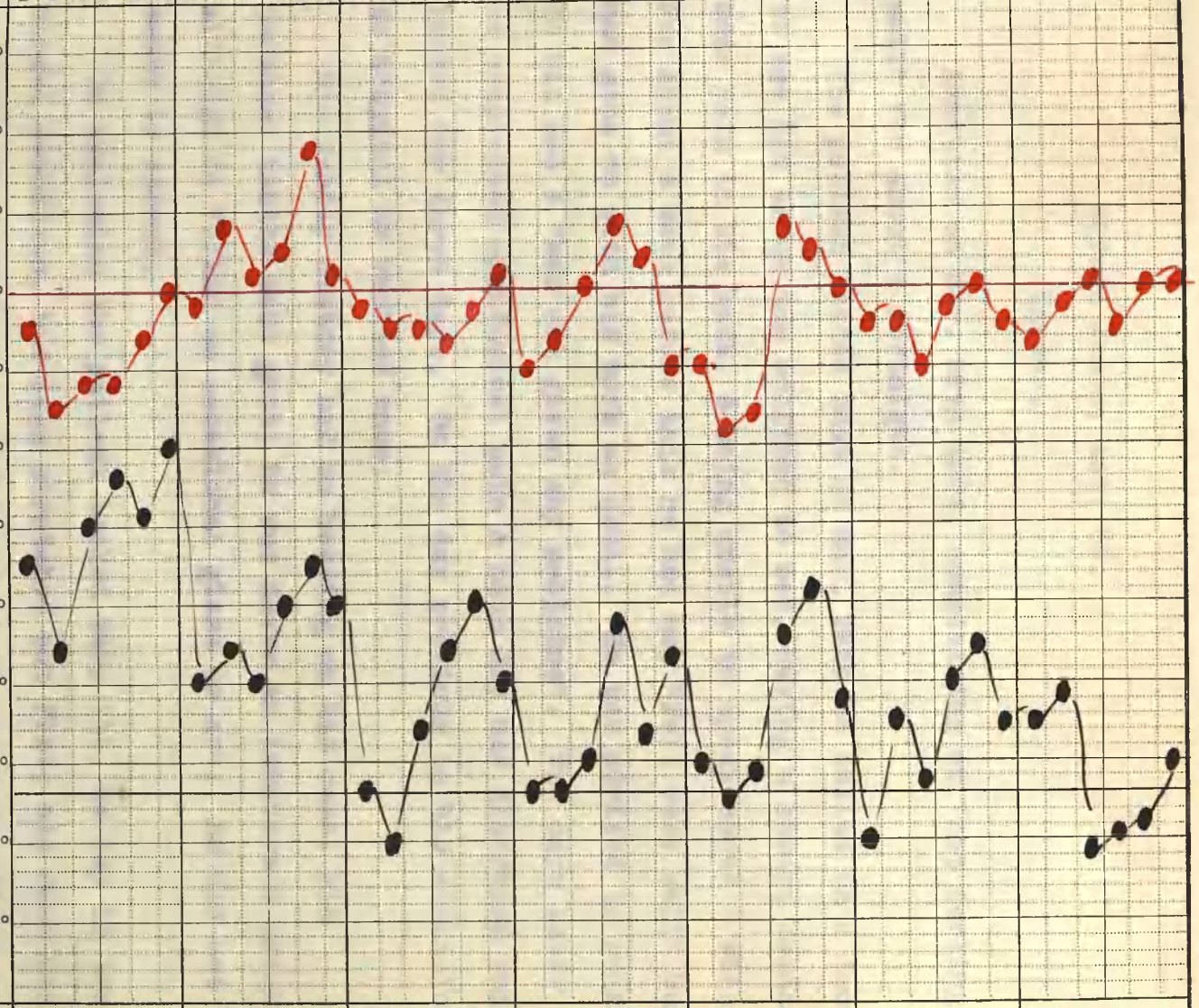
Date	29	30	31	1	2	3	4
Day of Disease							
Pulse							
Respiration							

Time: A.M / P.M — 2 6 10 2 6 10

R	P	T
65	170 (130)	108°
60	160 (120)	107°
55	150 (110)	106°
50	140 (100)	105°
45	130 (90)	104°
40	120 (80)	103°
35	110	102°
30	100	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°

Bowels

Urine



Alfred Jones, aet. 30.

Carter.

Admitted on Mar. 30th 1904, complaining of "not feeling well" for about a fortnight.

The patient stated that on Mar. 24th he called in a doctor to see him as he was confined to bed, having a severe headache, some pain in his back, & being unable to speak above a whisper. For about a week before this he had not "felt very well" but had gone on with his work as usual. He was advised to remain in his bed & "was not given any medicine". Two days later he complained of abdominal pain & next day had diarrhoea which lasted for three days. On the day previous to his admission to hospital he vomited once.

His family history had no bearing on his case; his personal habits were good; he was never an immoderate drinker although he "liked an occasional glass or so"; he did not smoke to excess.

On admission the patiemt looked very ill, he lay in the dorsal decubitus, his legs stretched out flat; his face was somewhat flushed but had nothing typical about it; there was no herpetic eruption round the mouth. He was fairly well nourished. His pupils were somewhat dilated & were equal in size; he seemed to be a little deaf but was in no way delirious; there was, however, a considerable amount of muscular tremor. His teeth were covered with sordes and were very carious. His tongue, which was only protruded with difficulty, was dry,

cracked, & of a brownish colour; there was a small clot of blood at the extreme tip. Examination of the chest revealed the facts that there was no increase in the area of precordial dulness, the apex beat was feeble, in the fifth interspace, inside the nipple line. The heart's sounds were both quite pure but the first sound was rather soft. There was no abnormal dulness anywhere in the chest; on auscultation, however, many bronchitic rales were heard all ~~through~~ over both lungs, both back & front. A few rose spots were seen on the abdomen; the latter was slightly distended, not at all tender, & was tympanitic all over. The liver dulness extended downwards, from a point one & a half inches below the nipple, for a distance of four & a half inches. The spleen was easily palpable, projecting about one inch from under the costal margin on deep inspiration. The urine was highly coloured, but otherwise normal; it gave a well marked diazo-reaction.

About half an hour after admission the patient passed per rectum, about Oz2 of fairly bright blood; as the pulse, although dicrotic, was of good amplitude & quite regular, no treatment was undertaken with special reference to the haemorrhage. During the following two days a few small clots were noted in the motions on two occasions. On the morning of April 2nd, there was a sudden dpop of three degrees in temperature &, later on, about Oz6 of darkish blood were passed; his lung condition was, however, improving, &, his tongue, although still dirty, was not quite so dry. Towards evening

his temperature again rose but, early on the following morning, there was a drop of five degrees, (I04.6°--98.8°), & his pulse rate fell from I20 to I00; during the day the bowels did not move. AS he seemed restless towards night he was given morphia gr¼ & under this passed a very comfortable night. Early on the morning of the 4th, he passed some five ounces of very dark, partly clotted blood; his tongue, however, was much cleaner, the rhonchi had nearly gone from his lungs &, altogether, he seemed in a better state than at any time previously. His temperature at I0 AM was I03.8°; at 2PM, however, it had dropped to 98.8° & the patient, although looking a little blue, expressed himself as feeling cool & comfortable; his pulse, although soft, was of very good volume. About 5.45 PM he passed 0z6 of recent blood &, as he, ~~if anything~~ looked more cyanosed & his pulse, although still of fairly good volume, was appreciably softer, he was given Adrenalin MX hypodermically. No change was noted, by the fingers, in the character of the beat & this was corroborated also by sphygmographic tracing taken before & after administration; the rate, however, increased a matter of four beats per minute. He then passed a comfortable night & next morning, at the time of the morning round, looked, & expressed himself as feeling, better; his pulse being of better tension, as felt by the fingers, & showing the same feature also on a sphygmographic tracing. Although the patient had passed a stool containing one or two minute milk curds it did not contain any blood. At I.I5 P.M.

(5th) he was seized with sudden & severe abdominal pain; so severe as to make him cry out: I was at once sent for & found him lying on his back, his legs drawn up, beads of perspiration on his forehead, & uttering a continuous moaning cry, evidently in great pain. Examination revealed tenderness in the right lumber region & complete absence of liver dulness. The diagnosis was obvious, so, pending arrangements for operation, he was given morphia gr¼ & presently became less uneasy. About 2.15 ~~P/P~~ P.M. the abdomen was ~~p~~ opened & a small perforation was found & stitched; the operation taking about half an hour & being borne fairly well. There was no vomiting on recovery from the anaesthetic & the patient passed a comfortably night. The next morning (6th) the pulse was good & there was no pain at all; a little semi-purulent fluid was sucked up from the bottom of the drainage tube & the wound re-dressed. During the course of the day the bowels moved, the motion being of the ordinary typhoid type, unaccompanied by blood. Towards night, however, his pulse became much weaker & he became cyanosed, this latter increased slowly &, early next morning he died. (y")

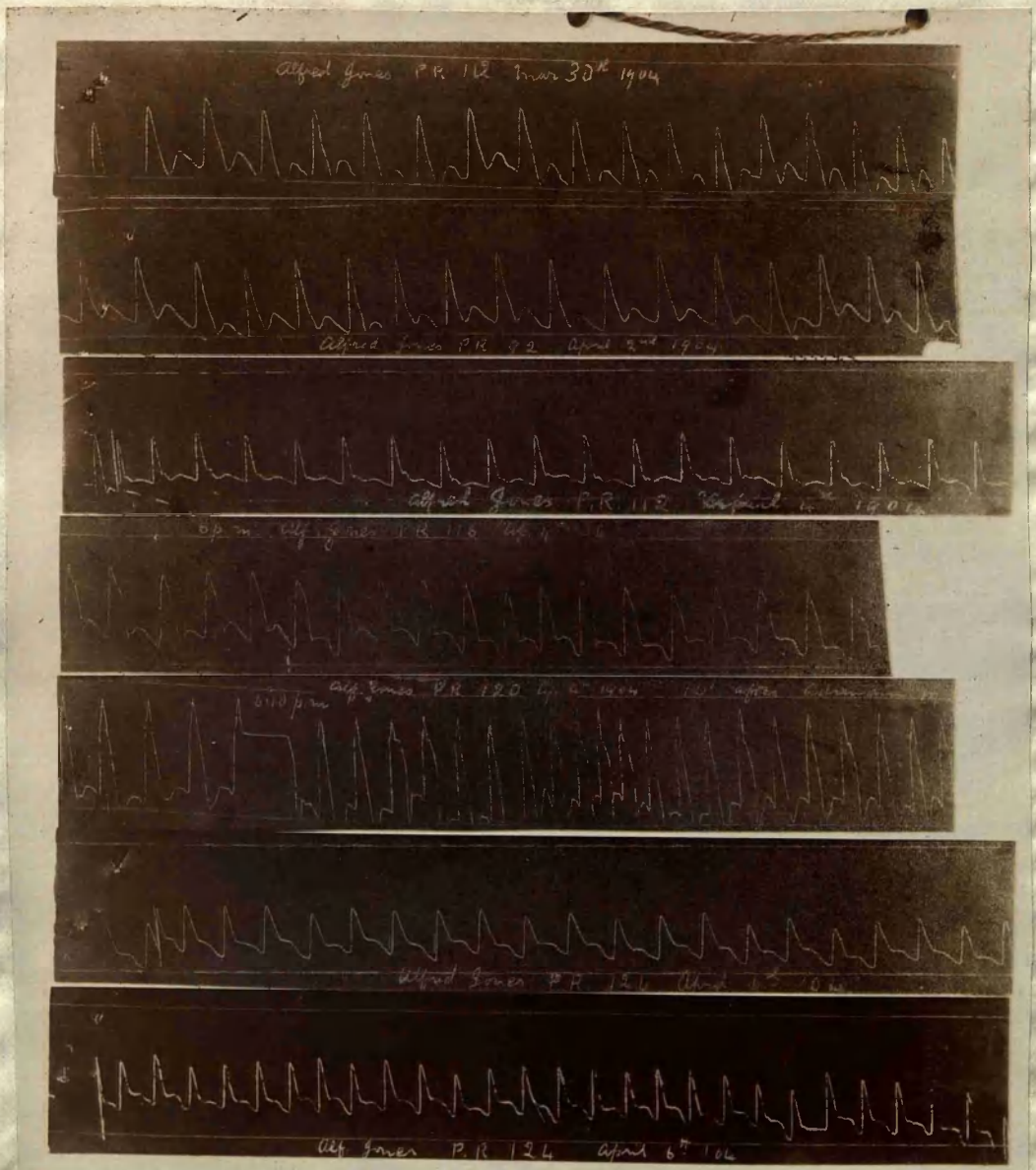
Post-Mortem Examination Notes.

The body is that of an emaciated adult male; there is a considerable ~~amount~~ degree of post-mortem staining in the dependent parts & some slight greenish discolouration over the abdomen

the latter showing a recent wound, about four inches long, in the right iliac region. Post-Mortem rigidity is still present to a large extent.

On opening the Thorax no adhesions between the pleural layers are found anywhere. The pericardium shows a smooth internal surface & contains a little straw-coloured fluid. The heart shows no excess of fat; on opening the organ the muscle is seen to be of good colour; the left ventricle contains a little ante-mortem clot which extends into the aorta; the left auricle shows no abnormality. The right ventricle, which is rather thin walled, contains a considerable amount of ante-mortem clot extending into it from the right auricle; the latter is practically full of the clot. There are no signs of any valvular disease. The lungs on section show a large amount of hypostatic congestion, especially in their lower lobes; at the apex of the right lung there is a small patch of healed tubercle. In the region of the original abdominal wound some lymphatic exudate can be seen &, at the bottom of a drainage tube, a small, absolutely locallised, collection of sanguineous pus is present; nowhere else is lymphatic exudate present. The intestines, here & there, show discoloured, congested patches, & on one coil a suture can be seen, partially covered by lymph. After removing the intestines many enlarged mesenteric glands are seen. On opening the small intestine a considerable number of typhoid ulcers are seen, from practically all of which the sloughs have separated.

At a distance of seven feet from the ilio-caecal valve, an ulcer, which has perforated the serous coat, is seen; the repairing suture can be partially seen from the outer surface. There are no ulcers nearer the duodenum than the one last referred to. There is absolutely no ulceration in the caecum or in the remainder of the large intestine. The bowel does not contain any blood. The Liver shows a somewhat discoloured surface, but is otherwise normal. The gall bladder is rather distended but its contents are normal. The Spleen is considerably enlarged, measuring about six & a half inches in its long axis; it is also very soft & diffluent. The pancreas shows no abnormality; neither do the kidneys nor the suprarenal capsules: microscopic examination of the latter discovers a little cloudy swelling but nothing else of note.


Alfred Jones P.R. 112 Mar 30th 1904
Alfred Jones P.R. 92 April 2nd 1904
Alfred Jones P.R. 112 April 4th 1904
6 p.m. Alf. Jones P.R. 118 Apl 4
Alf. Jones P.R. 120 Apl 6th 1904
6.10 p.m.
Alfred Jones P.R. 124 April 6th 04
Alf Jones P.R. 124 April 6th 04

General Register No.

DISEASE.

Name Alfred Jones

Age 30 Date of Admission Mar. 30th.

Diet & Treatment

Result

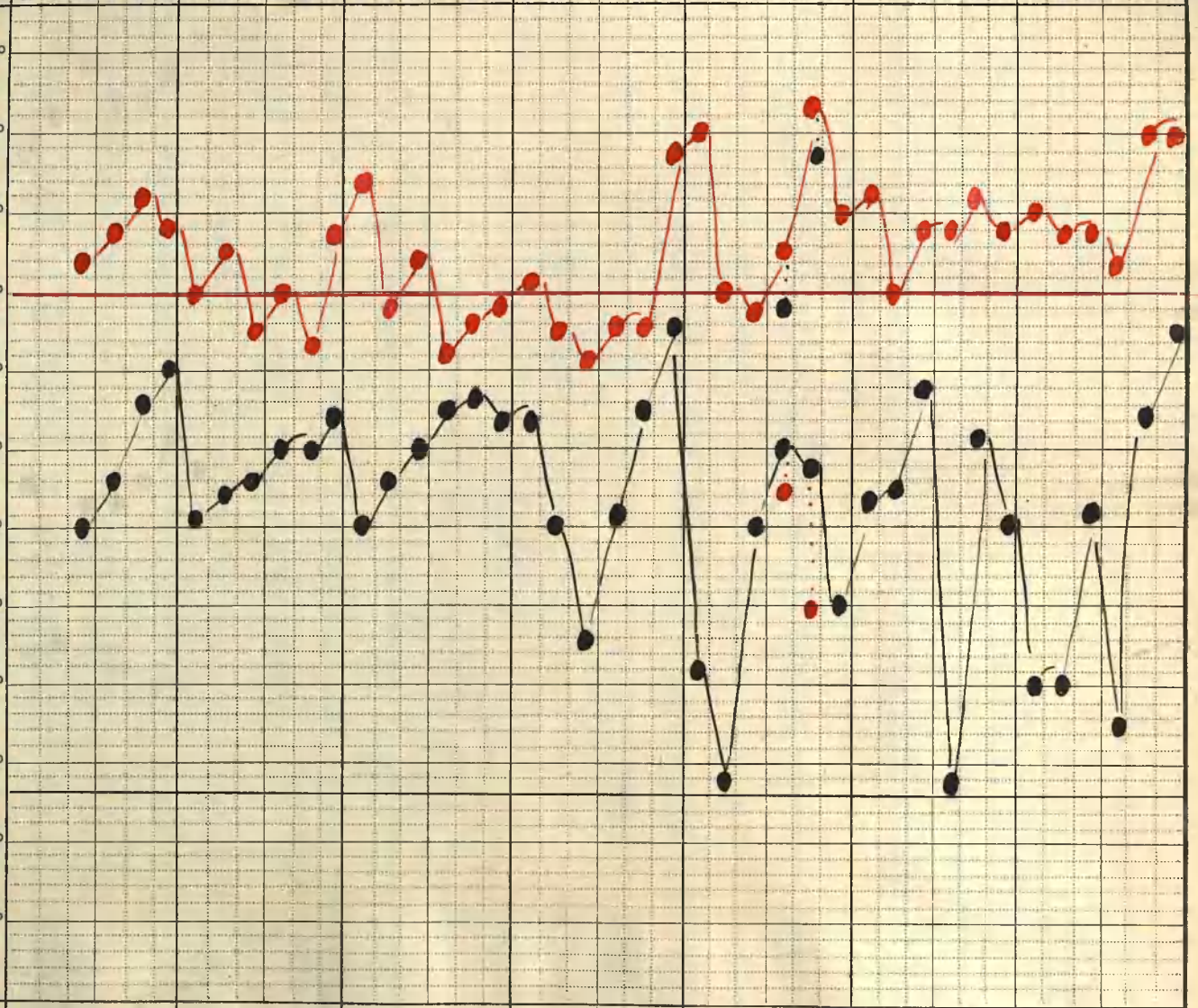
Date	30	31	1	2	3	4	5
Day of Disease							
Pulse							
Respiration							

Time: A.M 2 6 10 | P.M 2 6 10 (repeated for each day)

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80 NORMAL TEMPERATURE OF BODY.	99°
15	70	98°
10	60	97°

Bowels

Urine



General Register No.

DISEASE.

Name Alfred Jones

Age Date of Admission

Diet & Treatment

Result

Date	6	4										
Day of Disease												
Pulse												
Respiration												
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°

Bowels												
Urine												

5

James Kay, aet.2I.

Engine-cleaner.

Admitted on Mar.3Ist, I904, complaining of headache & abdominal pain during about a fortnight.

The patient stated that on March I6th he experienced headache &, during the few days following, he complained of abdominal pain & diarrhoea. On Mar.25th, because he was delirious, a doctor was called in, who, on Mar.3Ist, advised his removal to hospital. A specimen of his blood gave a positive reaction with Widal's test.

On admission the patient was seen to be a man of poor physique, somewhat pale & rather emaciated. His tongue was covered with a thick white fur, except at the tip where it was clean & red; his mouth was fairly clean.

With the exception of an occasional bronchial rhonchus his lungs were healthy; his heart showed no abnormality beyond a slight weakness of the first sound. The abdomen showed a considerable degree of distension & there were many typical rose spots all over its surface. Palpation showed a considerable degree of tenderness. The spleen was not palpable. The liver dulness extended from the upper margin of the fifth rib in the nipple line, downwards for a distance of four & a half inches.

Two days after admission the distension had become slightly less, the tenderness was much less & the spleen was easily palpable.

For the first seventeen days of residence the disease

ran a more or less normal course & the patient seemed to be progressing fairly well. On the morning of April I7th, however, he passed Oz2 of bright blood & four hours later passed about OzIO dark; the pulse remained very good, but the temperature dropped to 96°. On the following day, at 9.20 P.M., he passed Oz9 of fresh blood &, at I2.I5 A.M. on the I9th, he passed Oz8 containing clots; after this he was given Adrenalin M5 by mouth. At 2 A.M. he passed OzIO of blood & at 3 A.M. a like quantity, the first fresh, the second clotted: adrenalin (MX) & morphia Gr¼ were then given hypodermically. His pulse at about IO A.M. was very feeble & slow but quite regular. There was then no more haemorrhage until I2.I5 A.M. the following day (20th) when OzI4 of bright blood were passed & a like quantity (OzI5) again at 6.20 A.M.; his pulse rate rose to I20 per minute & his pulse was very feeble. On the first occasion (I2.I5A.M.) he was given adrenalin MX & morphia Gr¼ hypodermically but, as this seemed to be absolutely ineffectual, he was given, after the second haemorrhage (at 6.20.A.M.) morphia Gr¼ & inject. ergotae hypo. MX. There was then no more haemorrhage until 3.20 P.M. on the same day (20th) when OzI3 of fresh blood appeared: morphia was again given &, from this time, was the only drug administered; not that it seemed to be any more efficacious than the other two tried but simply that it was the routine treatment. The haemorrhage continued, OzIO of dark blood being passed at 2,30 A.M. on the 2Ist but,

during this day there was no more haemorrhage & the pulse once again became very satisfactory . On the 22nd Oz13 of dark blood were passed at 3.30A.M., Oz24 of fresh at 10A.M., & Oz7 of dark at 6P.M.; by then the pulse at the wrist had disappeared so he was given three pints of normal saline solution into the subcutaneous cellular tissue. Next morning he seemed slightly better but, towards evening, he again became practically pulseless; saline fluid, to the amount of two pints & a half, was again given. He did not, however, rally, but died about 5P.M. on the 24th. He passed in all Oz 145 of blood during a matter of seven days.

Post Mortem Examination.

With the exception of the bowel condition there was nothing of interest found, all the other organs being apparently healthy; the spleen, however, was large & soft.
The bowel did not show ulceration anywhere except in the last six inches of the ileum; this latter portion had ulcers in it &, in the last two inches, there were several coallescing one with the other, the anterior half of the circumferance being practically one large ulcer from which the sloughs had entirely separated. There was a considerable quantity of dark blood in the large intestine. No special vessel, from which haemorrhage might have occurred, was noted.


Jamie Kay P.R. 88 April 15 1904
Kay PR 80 April 17th '04
Kay PR 72 April 19th '04
Kay P.R. 80 April 21st '04

General Register No.

DISEASE.

Name Jas. Kay.

Age 21 Date of Admission

Mar: 31st

Diet, & Treatment

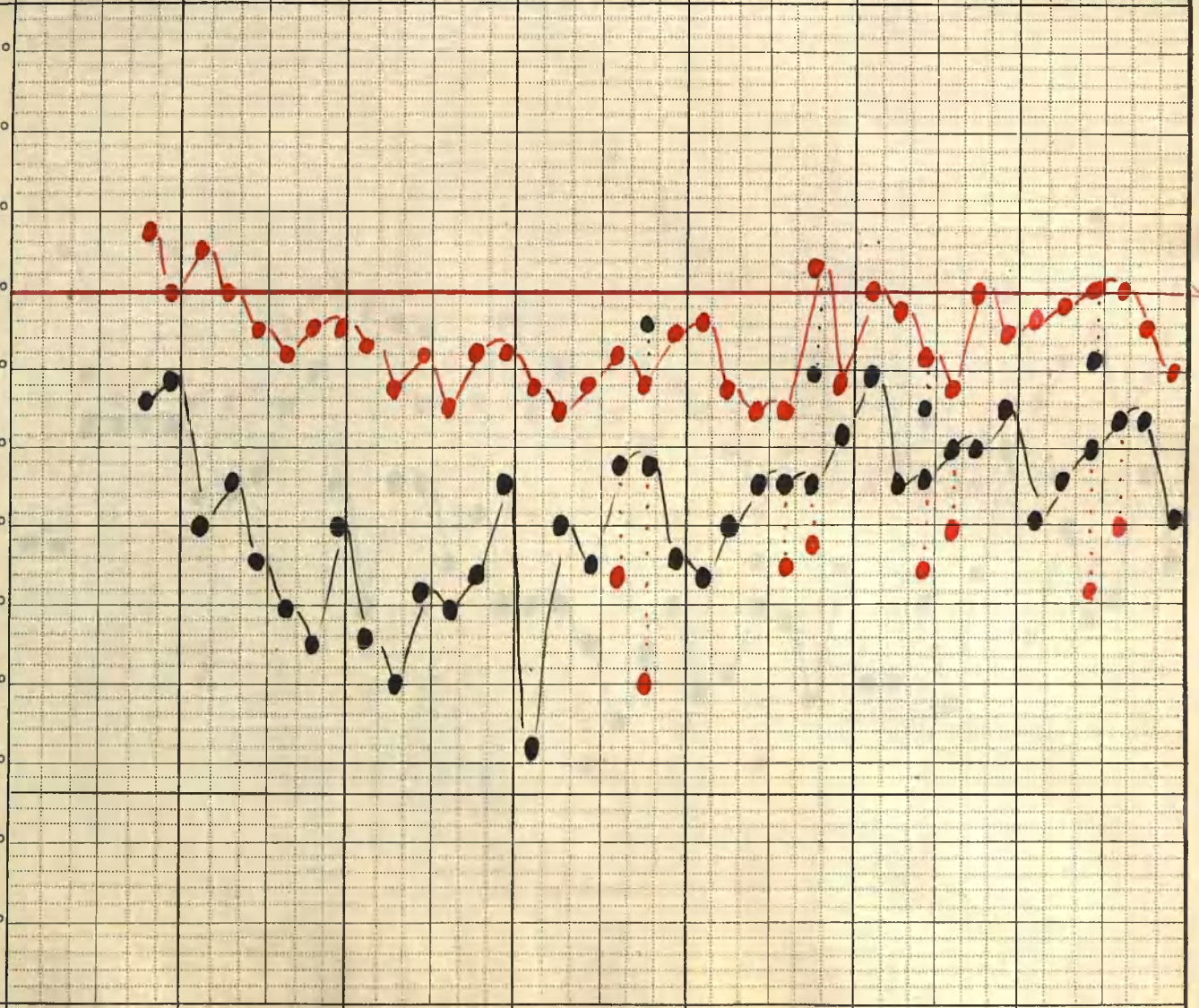
Result

Date	Mar 31	1	2	3	4	5	6
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°

Bowels

Urine



General Register No.

DISEASE.

Name Kay.

Age ..... Date of Admission

Diet & Treatment

Result

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°

Date	7						8						9						10						11						12						13					
Day of Disease																																											
Pulse																																										
Respiration																																										
Time	A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10

Bowels

Urine

General Register No.

DISEASE.

Name Kay.

Age ..... Date of Admission

Diet & Treatment

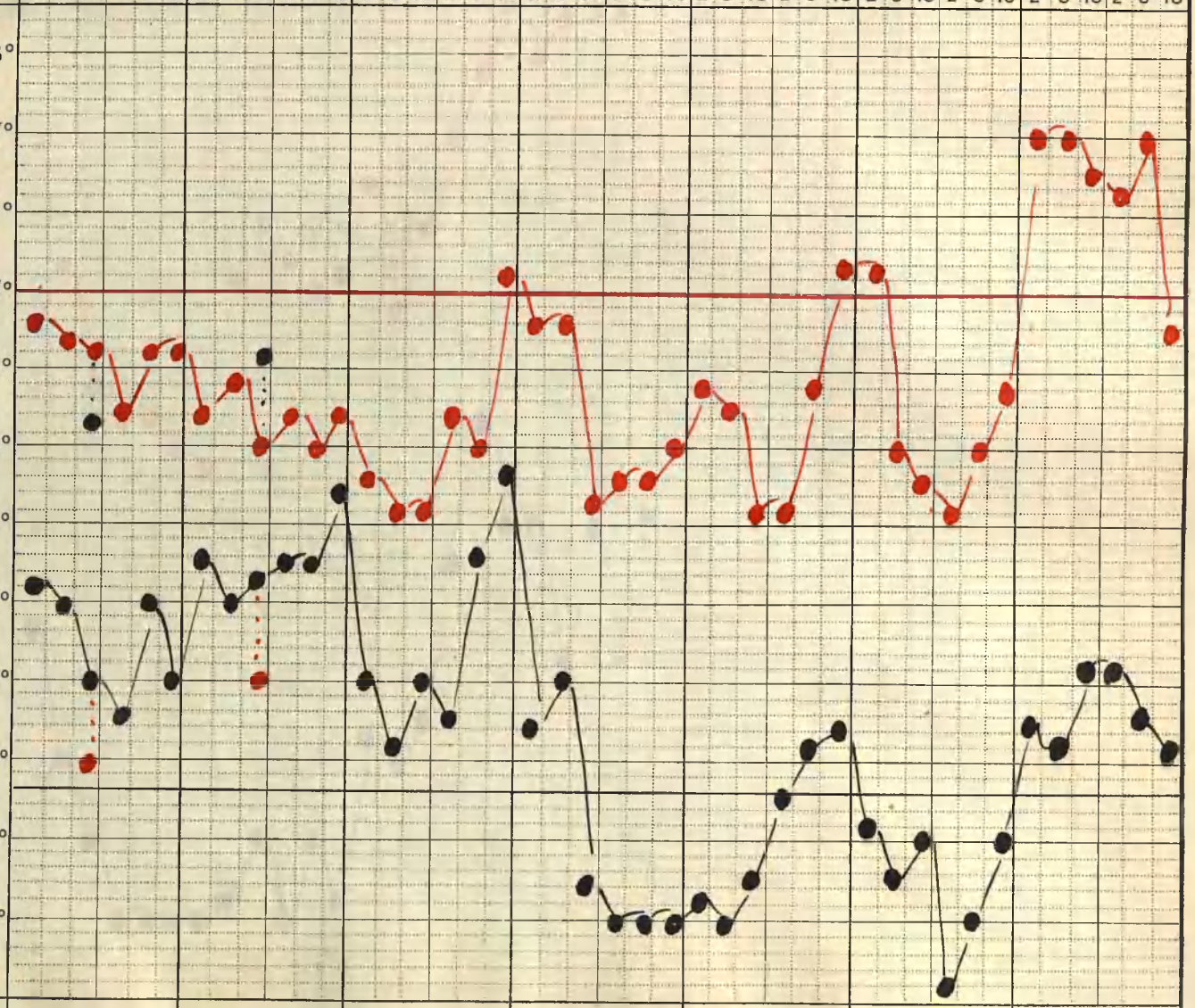
Result

Date	4	15	16	17	18	19	20
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80 NORMAL TEMPERATURE OF BODY.	99°
15	70	98°
10	60	97°

Bowels

Urine



General Register No.

DISEASE.

Name Kay.

Age ..... Date of Admission .....

Diet & Treatment

Result

Date	21		22		23		24		25		26		
Day of Disease													
Pulse													
Respiration													
Time	A.M 2 6 10	P.M 2 6 10	A.M 2 6 10	P.M 2 6 10	A.M 2 6 10	P.M 2 6 10	A.M 2 6 10	P.M 2 6 10	A.M 2 6 10	P.M 2 6 10	A.M 2 6 10	P.M 2 6 10	A.M 2 6 10	P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80 NORMAL TEMPERATURE OF BODY.	99°
15	70	98°
10	60	97°

Bowels

Urine

b

Joseph Bailey. aet.23.

Plumber.

Admitted on May 5th, I904 complaining of pain in the abdomen, diarrhoea, & loss of voice; all of these symptoms having been present at intervals during about three weeks.

The patient stated that on April I7th he suffered from severe headache & shivered once or twice in the course of the day. He went to bed &, the following day , had an attack of diarrhoea & experienced abdominal pain. On April I9th it was noticed that his abdomen was distended &, on the following day, he vomited several times; on April 2Ist his voice became husky. On May 30th, as he did not seem to progress towards recovery, a doctor was called in, &, on May 3rd, his blood was found to give a positive reaction with Widal's test. Three days later he was removed to hospital.

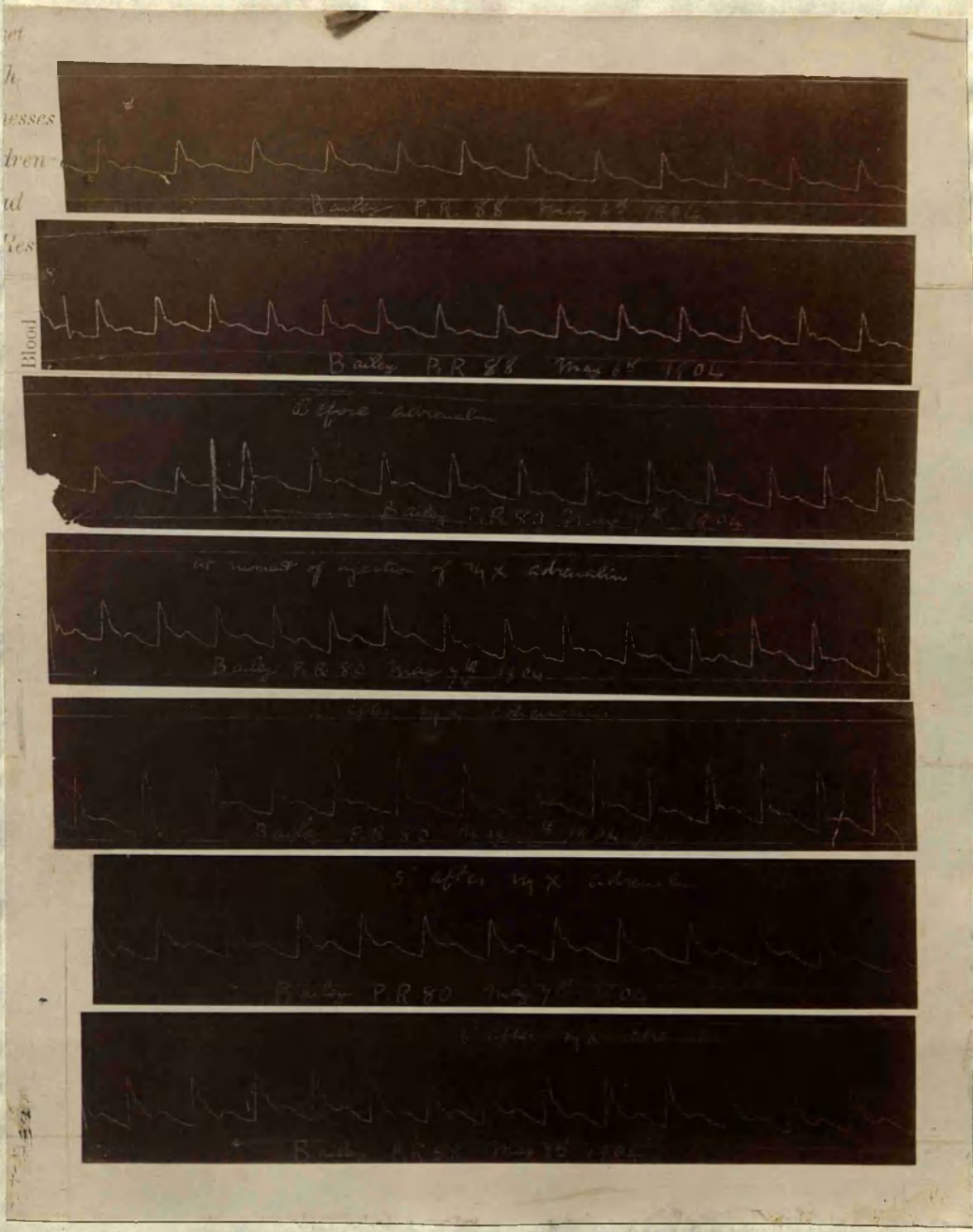
On admission he lay in the dorsal decubitus & had not the appearance of a man very ill; his colour was fairly good & his eyes open & intelligent. His tongue was dry, cracked, & somewhat furred, his pulse, which numbered I00 per minute, was of good tension & regular in force & rhythm. Examination revealed no abnormality in his heart or lungs. There was a very moderate degree of abdominal distension but apparently no tenderness. The liver dulness extended from the lower border of the fifth rib, in the nipple line, to the costal margin. There was no appreciable splenic enlargement. A few rose spots were seen over the

surface of the abdomen. The urine, which was acid & somewhat highly coloured, was free from sugar & albumin.

On May 6th, as there had been no movement of the bowels for some two days previously, an enema was given; in the resulting stool there was a small blood clot. Later on in the evening, (about 5 P.M.), the patient passed Oz3 of fresh blood &, about four hours later, he passed other Oz5 also fresh; his pulse remained good. At 2 o'clock on the morning of May 7th his temperature was found to be 97.4°, (four hours earlier it had been 102°), at 6 A.M. it was 100.6° & at 10 A.M.-- when I saw him-- it was 97°; he seemed quite comfortable & his pulse was 80 per minute, of fairly good force & of fair tension. The drop in temperature making me suspect haemorrhage, I decided to administer Adrenalin & gave MX of the solution, hypodermically. His temperature gradually rase again to 101° at 10 P.M. & his pulse remained good, numbering between 80 & 100 per minute at different hours during the ~~day~~ day. About thirty hours later as there had been no further sudden large variations of temperature & likewise no movement of the bowels, an enema was given; the stool was seen to be very dark in colour & contained several blood clots of fair size. There was no more haemorrhage in this case & his convalescence was rapid & complete.

There was no difference to be felt in the radial pulse, either during or after the adrenalin administration, & the

sphygmographic tracings taken at the time also failed to show appreciable difference, except a slight slowing of the pulse rate.


Bailey P.R. 88 May 6th 1904
Bailey P.R. 88 May 6th 1904
Before adrenalin
Bailey P.R. 80 May 6th 1904
At moment of injection of 1/2 c.c. adrenalin
Bailey P.R. 80 May 6th 1904
Bailey P.R. 80 May 6th 1904
5' after 1/2 c.c. adrenalin
Bailey P.R. 80 May 6th 1904
Bailey P.R. 84 May 6th 1904

General Register No.

DISEASE.

Name Bailey

Age Date of Admission

May 5th

Diet & Treatment

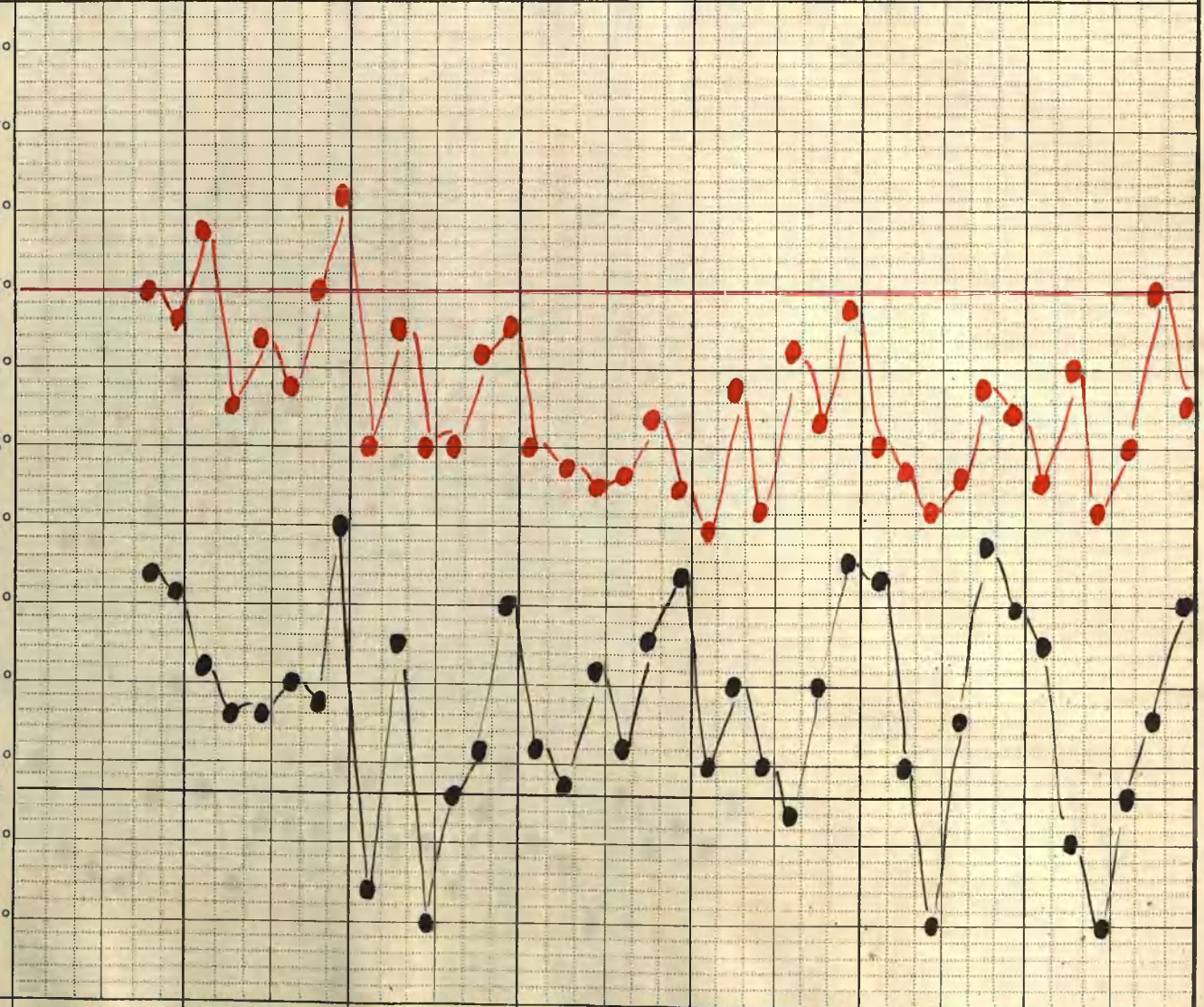
Result

Date	5	6	7	8	9	10	11
Day of Disease							
Pulse							
Respiration							
Time	A.M / P.M	A.M / P.M	A.M / P.M	A.M / P.M	A.M / P.M	A.M / P.M	A.M / P.M
	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°

Bowels

Urine



General Register No.

DISEASE.

Name Bailey

Age ..... Date of Admission

Diet & Treatment

Result

Date	12						13						14						15						16											
Day of Disease																																				
Pulse																																				
Respiration																																				
Time	A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M			A.M			P.M		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
15	70	98°
10	60	97°

NORMAL TEMPERATURE OF BODY.

Bowels

Urine

Albert Todd. aet.26.

Points-man.

Admitted on June 28th I904, complaining of abdominal pain & diarrhoea of about seventeen days duration.

His wife stated that on June IIth he complained of severe headache & had an attack of diarrhoea which recurred later, the following day he complained of abdominal pain & went to bed, where he remained. On June 20th his throat became painful & a few days later his voice became hoarse & he could only speak in a whisper. During the two days immediately preceding admission he was delirious & on several occasions got out of bed. A specimen of his blood having given a positive reaction with Widal's test, his doctor advised his removal to hospital.

On admission the patient was a well developed, fairly muscular man, lay in a semi-comatose state & could be roused only with difficulty. His face was flushed & his eyes dull & sunken; his mouth was dirty, the teeth covered with sordes & the tongue, which was dry & cracked, with a brown fur: the pulse numbered I26 per minute & the temperature was I04.2°. There was no increase in the area of precordial dulness; the heart's sounds were weak but pure: there was slight dulness at the right apex in front &, over this area, there were rales & bronchial breathing; all over the rest of the chest, both back & front, numerous bronchitic rhonchi were heard. The abdomen was neither distended nor, as far as could be

ascertained, tender. The liver dulness extended from the lower border of the fifth rib, in the nipple line, to one & a half inches below the costal margin; the spleen was easily palpable. Many rose spots were seen over the chest & abdomen.

About 10.45 P.M. on the day of admission the patient passed per rectum 0z3 of fresh blood &, during the following eight hours, although the pulse remained full & dicrotic, & numbered not more than 112 per minute, the temperature fell a matter of four degrees. At 8 P.M. on June 29th he passed 0z11 of clotted blood &, four hours later, this occurred again. At 6.30 A.M. on the 30th he passed 0z12 of fresh blood & was then given Adrenalin MX hypodermically; his pulse, which was soft & fairly full, numbered 120 per minute before the adrenalin was given &, after administration, beyond an immediate slowing to 112 per minute, showed no appreciable change, again numbering 120 per minute after an interval of ten minutes. Two hours later (8.30 A.M.) 0z20 of fresh blood were passed & at 9 A.M. he was again given adrenalin MX; his pulse at this time was easily compressible but regular, numbering 120 per minute before the adrenalin & 116 immediately afterwards, returning to the former three minutes later. The pulse tracings, taken immediately before & after the second administration of the drug, showed no appreciable differences except, possibly, a slight increase in dicrotism after the drug. At 11 A.M. 0z10 of more or less clotted blood were passed & after this

the haemorrhage, which had apparently stopped, recommenced, Ozll of fresh unclotted blood being passed at noon. After this latter the adrenalin was given in MX doses three hourly. At 8 P.M. Oz8 of clotted blood were passed & at 10P.M. Oz 7 also clotted. Unfortunately the adrenalin, which should have been given three hourly, was omitted when it was due at 1 A.M. & was not given until 2.30A.M., another haemorrhage had apparently occurred about that time as the patient collapsed. About 3 A.M. he passed Oz10 of fresh blood & twenty minutes later, he died.(July 1st)

Towards evening on the first two days of residence in hospital the patient was inclined to be restless & occasionally violent but, during the remainder of the time, he was in a more or less languid & apathetic condition, as he was on the evening before he died.

Post Mortem Examination.

The body was that of a well nourished adult male; there was no post mortem staining; rigor mortis was present to a considerable degree.

The pericardium contained Ozl½ of clear straw-coloured fluid. The right auricle contained a little ante mortem clot; the heart's muscle, although somewhat pale, appeared normal; there was no valvular disease.

There were a couple of old adhesions between the two pleural layers at the apex of the right lower lobe behind; on cutting the lungs they were found to be rather oedematous

the bronchi contained a considerable amount of frothy exudation; there were no other indications of present or past lung disease. The larynx, although congested, showed no ulceration; there were, however, several small ulcers on the epiglottis.

There was a considerable amount of gas~~eous~~ in the large bowel but little or none in the small bowel; neither containdd blood. On opening the bowel many ulcers were seen, the ulcerated area comprising the lower eight feet -of the small & upper one & a half ∅ feet of the large bowel. The floor of some of the ulcers was clean but that of others still contained a sloughing, necrotic portion. A Maekel's diverticulum about three inches long also showed several small ulcers in its walls. No large ulcerated vessel was noticed. There were a few enlarged mesenteric glands. The liver was large & somewhat fatty, the spleen was very large, soft,& diffluent, the kidneys showed some slight fatty change. The suprarenals appeared normal macroscopically &, microscopically, showed no change beyond a slight degree of cloudy swelling.

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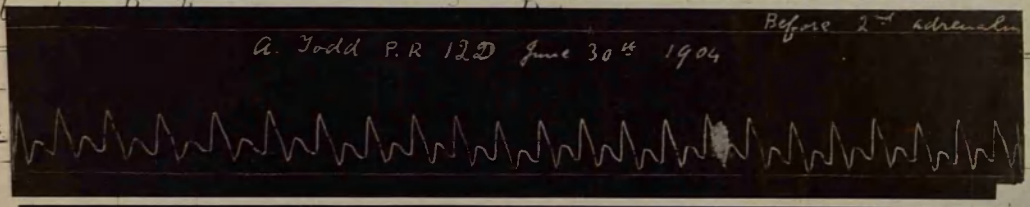
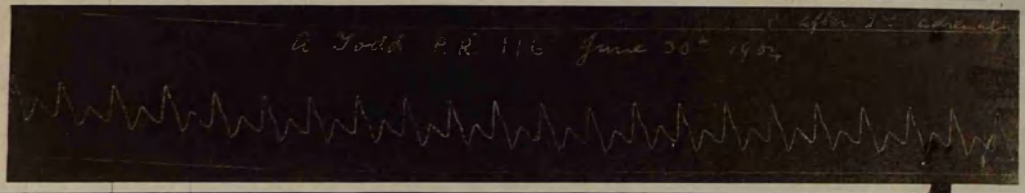




General Register No.

DISEASE.

Name Todd.

Age Date of Admission

June 28

Diet & Treatment

Result

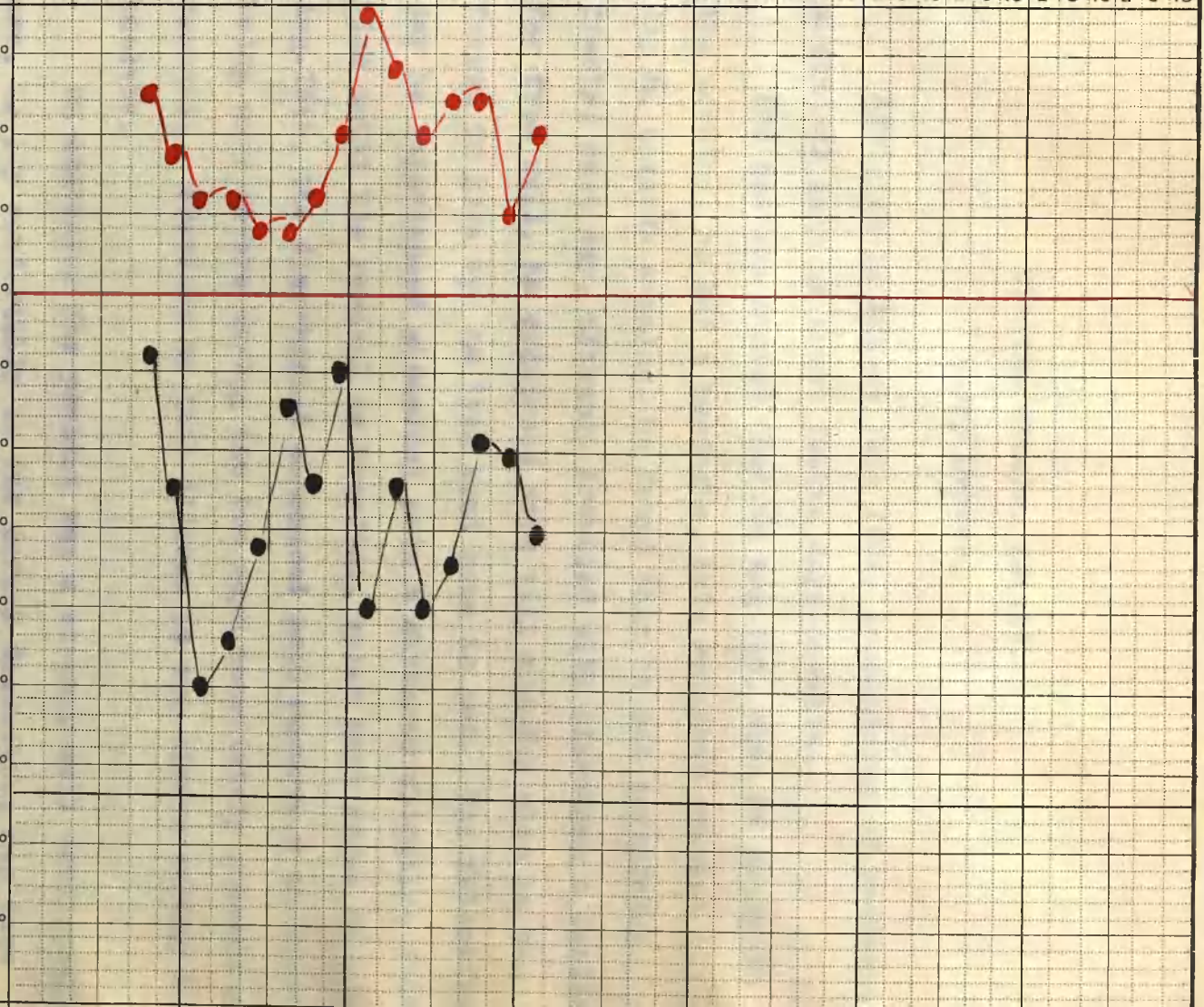
Date	28	29	30	1	2	3	4
Day of Disease							
Pulse							
Respiration							
Time	A.M P.M (2 6 10 2 6 10)	A.M P.M (2 6 10 2 6 10)	A.M P.M (2 6 10 2 6 10)	A.M P.M (2 6 10 2 6 10)	A.M P.M (2 6 10 2 6 10)	A.M P.M (2 6 10 2 6 10)	A.M P.M (2 6 10 2 6 10)

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	~~100~~ 60	101°
25	90	100°
20	80	99°
15	70	98°
10	60	97°

NORMAL TEMPERATURE OF BODY.

Bowels

Urine



William Steele. aet.25.

Lorry Driver.

Admitted on August I2th I904, complaining of headache & abdominal pain of about twelve days duration.

The patient stated that on Aug.Ist, when he awoke in the morning, he had a headache, this remained present all day &, towards evening, he found that he was perspiring freely; next day, although troubled with diarrhoea & feeling far from well, he continued work till mid-day when he was forced to give up; he then went home to bed. The following day he experienced abdominal pain & shivered slightly; from that time until his removal to hospital, which took place on Aug.I2th, the diarrhoea & abdominal pain recurre-d at intervals, being more severe during the two days immediately preceding removal. Previous to this illness he was always strong & healthy.

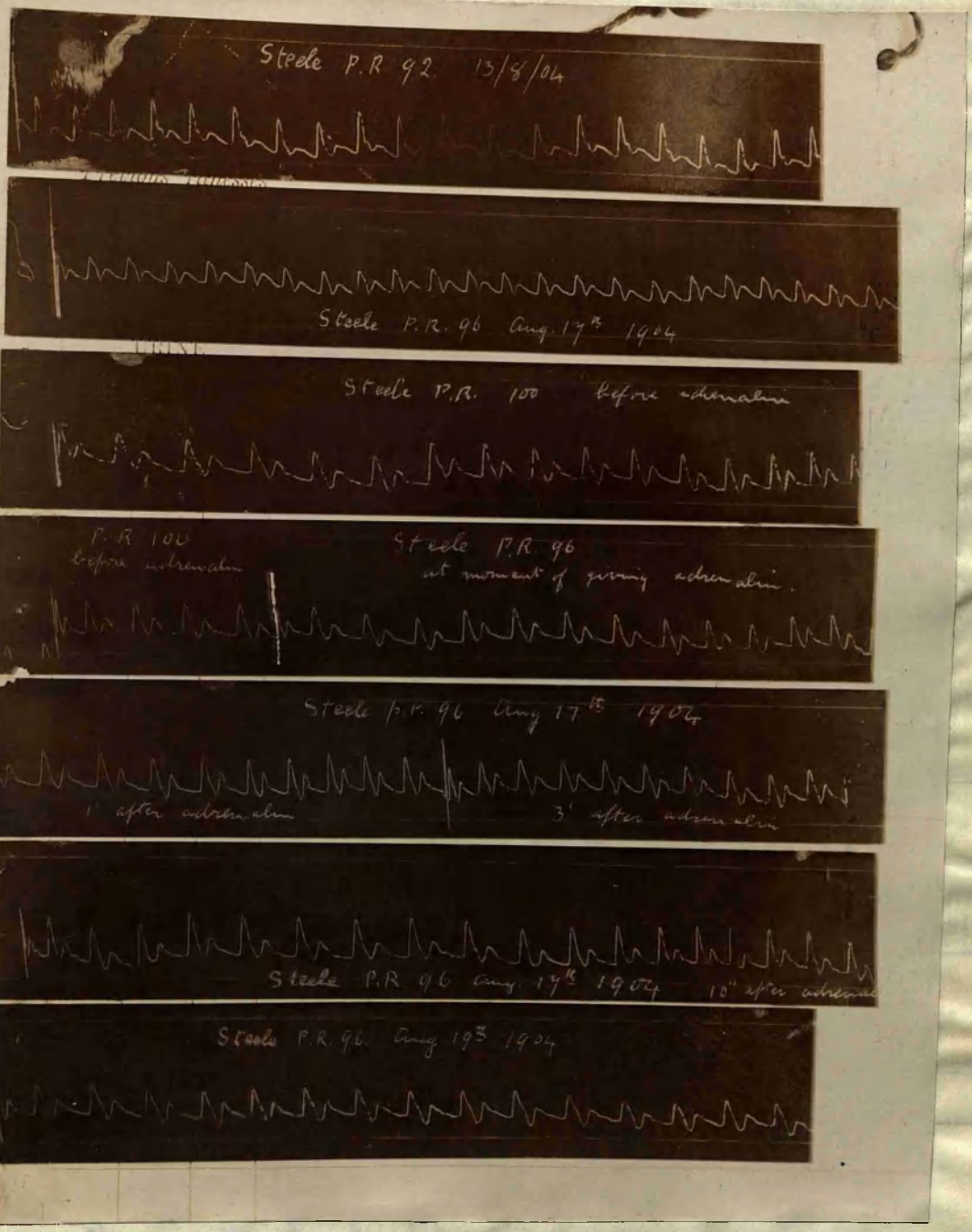
On admission the patient was a strong, well developed, man, he lay comfortably in the dorsal decubitus; his face was flushed & his eyes were rather dull & heavy. His whole appearance betokened a man ill but reacting fairly well against the disease. His tongue was dry, cracked, & covered with a brown fur; his pulse, which numbered I00 per minute, was of good tension & regular in force & rhythm; his temperature was I0I.2°.

Examination of his lungs revealed no abnormality excepting

an occasional bronchial rhonchus. There was no increase in the area of precordial dulness; the heart's sounds, although not very loud, were quite pure. The abdomen showed no distension but, in the left hypochondriac region, was slightly tender. The spleen was palpable on deepest inspiration only. The liver dulness extended from the upper border of the fifth rib in the nipple line, to a point half an inch below the costal margin. The urine, which was of a dark amber colour, contained neither sugar nor albumin.

During the first four days of residence the patient was troubled with very severe diarrhoea; the temperature ran about 100° & the pulse numbered between 90 & 100 per minute; although he showed no improvement he was, at least, not any worse. On Aug.17th, at 1 A.M. he passed Oz 20 of bright blood per rectum; at 2 A.M. his temperature was found to be 97° & his pulse rate had fallen slightly. As he was rather restless he was given morphia gr¼ &, from that time, was comfortable until about 2.30 P.M. when he again passed Oz20 of bright blood; his temperature at 2 P.M. was 98° & his pulse 100 per minute, somewhat soft but quite regular in force & rhythm. As the haemorrhages had occurred in such large quantities it was deemed neither advisable nor justifiable to await a third haemorrhage before commencing treatment, accordingly, about 3.30 P.M. he was given adrenalin MI0, &, beyond a slight slowing of the pulse rate, no appreciable change of any

kind was noted. At 5.30 P.M. having visited the ward in order to again administer adrenalin, I was informed that he had, five minutes previously, passed OzI2 of bright blood, I at once gave adrenalin MX & thereafter, in order to be certain that no mistake was made, I continued to give it every hour until three o'clock the following morning (Aug.I8th) & then, as he seemed perfectly comfortable & his pulse was of fairly good tension & regular in force & rhythm, & there had been no more haemorrhage, I gave instructions to continue the administration at intervals of two hours until I again saw the patient. At 4.30 A.M. the bowels moved, the motion being loose & containing blood clots but no fresh haemorrhage. After again seeing the patient I gave orders to continue the adrenalin two hourly & this was done until I0 A.M. on the following day, (Aug.I9th) when it was discontinued as the bowels had, during this time, moved thrice, the first two motions containing blood clots but the last (passed about 6 A.M.) being free from clots. He was comfortable, his temperature had gone up slightly, & altogether he seemed somewhat better. As he complained of feeling very hungry, food was cautiously recommenced.
This patient went on quite well until the first day of September when I lost sight of him, but I have since heard that he is now up out of bed & progressing well, he has not yet been discharged.


Steele P.R 92 13/8/04
Steele P.R. 96 Aug. 17th 1904
Steele P.R. 100 before adrenalin
P.R 100 before adrenalin
Steele P.R 96 at moment of giving adrenalin.
Steele P.R. 96 Aug 17th 1904
1' after adrenalin
3' after adrenalin
Steele P.R 96 Aug 17th 1904 10" after adrenal
Steele P.R. 96 Aug 19th 1904

General Register No.

DISEASE.

Name Wm Steele

Age 25 Date of Admission

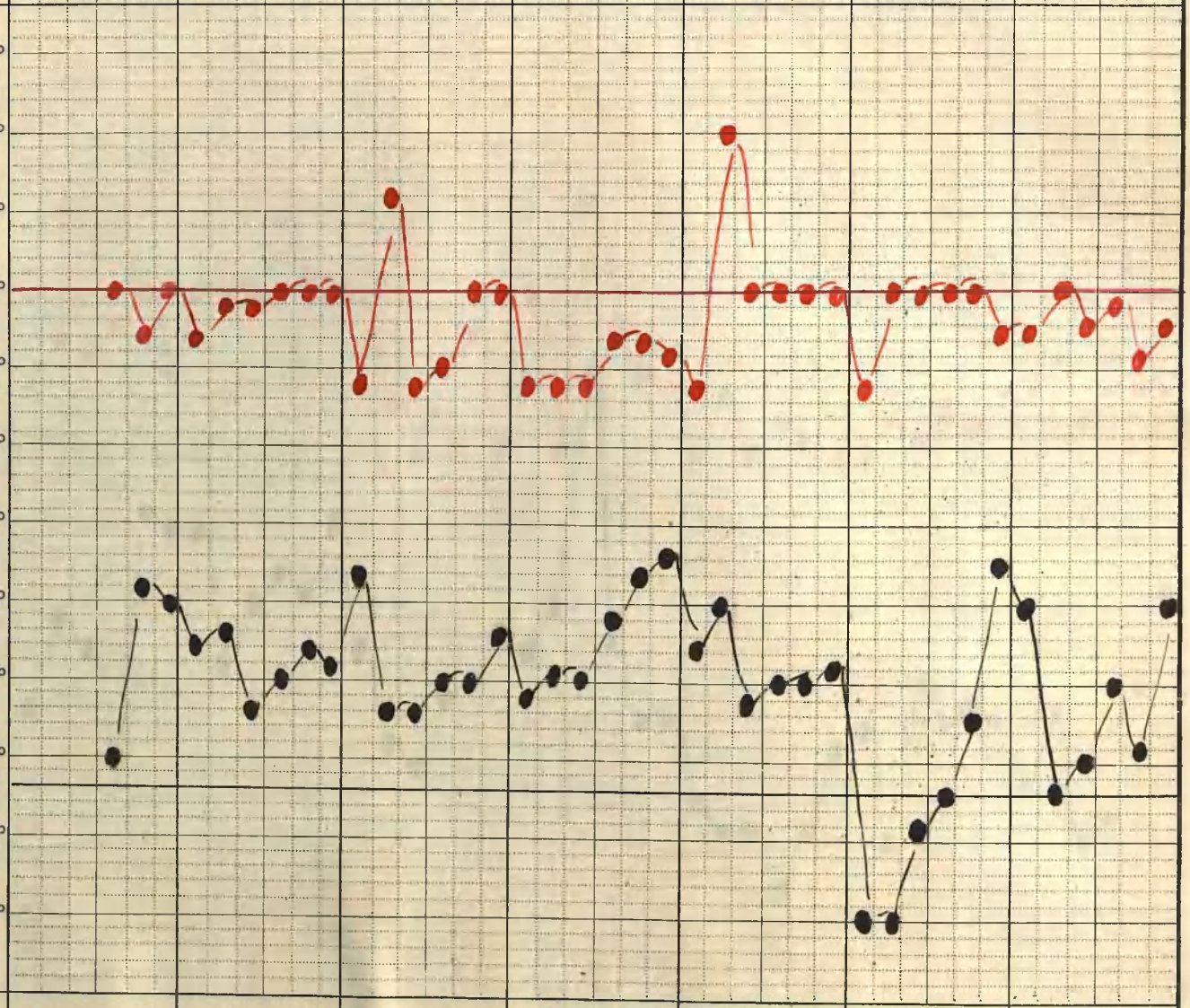
Aug 12/14

Diet & Treatment

Result

Date	12	13	14	15	16	17	18
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10
Bowels							
Urine							

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	130	104°
40	120	103°
35	110	102°
30	100	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°



General Register No.

DISEASE.

Name W. Steele

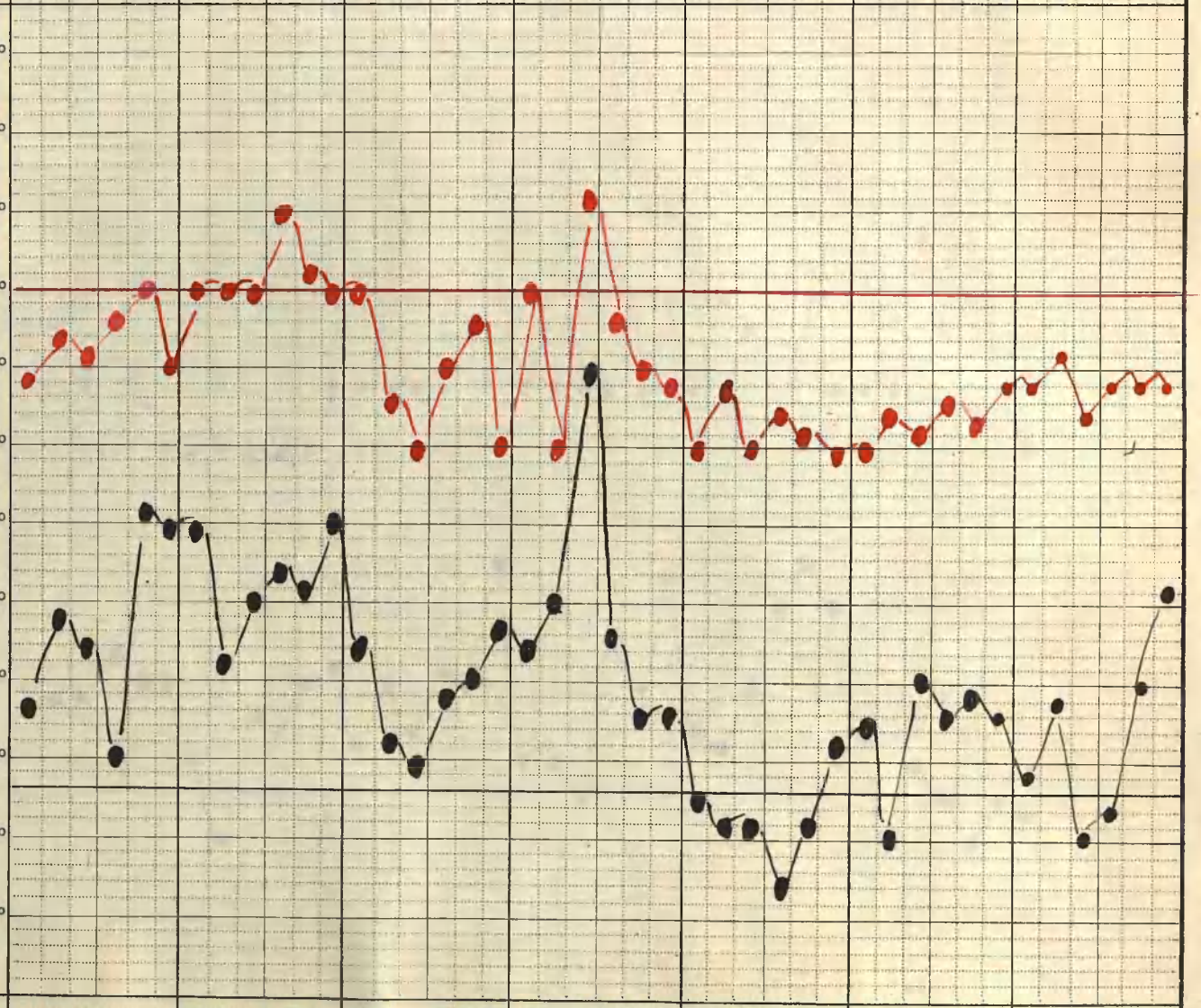
Age 25 Date of Admission Aug 12.

Diet & Treatment

Result

Date	19	20	21	22	23	24	25
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10	A.M 2 6 10 / P.M 2 6 10
Bowels							
Urine							

R	P	T
65	~~170~~ 120	108°
60	~~160~~ 90	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80	99°
	NORMAL TEMPERATURE OF BODY.	
15	70	98°
10	60	97°



General Register No.

DISEASE.

Name W Steele

Age 26 Date of Admission Aug 12 '04

Diet & Treatment

Result

Date	Aug 26	27	28	29	30	31	
Day of Disease							
Pulse							
Respiration							
Time	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10	A.M 2 6 10 P.M 2 6 10

R	P	T
65	~~170~~ 130	108°
60	~~160~~ 120	107°
55	~~150~~ 110	106°
50	~~140~~ 100	105°
45	~~130~~ 90	104°
40	~~120~~ 80	103°
35	~~110~~ 70	102°
30	100	101°
25	90	100°
20	80	99°
15	70	98°
10	60	97°

NORMAL TEMPERATURE OF BODY.

Bowels

Urine

Summary of Cases.

Laurence Cocker aet. 27 Enteric Fever . Compositor .

Admitted Nov. IIth. I903, about the middle of the second week of the disease . Widal+ . Chest normal ; abdomen distended , rose spots present . Haemorrhage on the I6th. , I7th. , I9th. ; Adrenalin on the I9th. , thereafter no more haemorrhage . Died on the 2Ist. .

William Wright aet. 26 Enteric Fever . Mill-hand .

Admitted on Jan. 4th. I904, about the end of the third week of the disease . Widal incomplete . A considerable degree of congestion was present at both bases behind ; there was a well marked systolic murmur; the abdomen was not distended rose spots were present; Haemorrhage on Jan. Ist, & 2nd. (before admission) & 4th. Adrenalin on the 4th. , with morphia, thereafter no more haemorrhage . Died on the 6th. .

Joseph Brewerton aet. 20. Enteric Fever, Soldier.

Admitted Jan. 22nd. , about the end of the second week of the disease. Widal+ . Chest normal; the abdomen was somewhat distended; no rose spots were seen. Haemorrhage on the 5th. continuing, in small amounts during the following days, until the I4th., when a large quantity was passed; treated up to this point with morphia with seemingly no effect; haemorrhage again on the I5th . , Adrenalin then given; on the I6th. passed some clotted blood; thereafter no more haemorrhage. Gradual convalescence, discharged well on April I5th. .

Alfred Jones, aet.30; Enteric Fever. Carter.

Admitted Mar.30,1904, about the end of the second week of the disease. Many bronchial rales in the lungs; the abdomen was slightly distended, the spleen was much enlarged, rose spots were present. Haemorrhage about half an hour after admission; a few clots during the following two days; haemorrhage again on April 2nd; morphia given to combat the restlessness; some clot on the morning of the 4th; haemorrhage again in the evening; Adrenalin then given. About mid-day on the 5th the bowel perforated, laparotomy was performed, the patient, however, died early on the 7th: a motion passed on the afternoon of the 6th contained no blood. P-M, no blood was found in the bowel.

James Kay aet. 2I. Enteric Fever. Engine-cleaner.

Admitted Mar. 3Ist I904, about the second week of the disease. Widal +. The lungs showed a few rhonchi, the heart's sounds were pure but weak; the abdomen was much distended; rose spots were present; the spleen was considerably enlarged. Haemorrhage on April I7th, I8th, & I9th, when Adrenalin was given by mouth, the haemorrhage continued; adrenalin was then given hypodermically; after twelve hours, more haemorrhage occurred; adrenalin & morphia were given, the haemorrhage continued; morphia & ergot were then tried; after this, morphia only was given but to no effect, as, despite this, & a saline infusion, he died on

April 24th. P-M. the large bowel contained a considerable quantity of dark blood.

Joseph Bailey aet. 23, Enteric Fever. ~~Points-man.~~ Plumber

Admitted on May 5th, I904, about the end of the third week of the disease. Widal+. Chest normal; abdomen slightly distended; rose spots present; spleen not appreciably enlarged. Haemorrhage on the 6th, on three occasions; a drop of temperature on the 7th, Adrenalin on the 7th; some clotted blood passed on the 8th, thereafter no more haemorrhage. Convalescence rapid, discharged in good health on May 26th.

Albert Todd aet.23, Enteric Fever. Points-man.

Admitted on June 28th, I904, towards the end of the third week of the disease. the lungs showed general bronchitis & a small pneumonic patch at the right apex; the heart's sounds were weak but pure; no abdominal distension; rose spots were present; the spleen was considerably enlarged. Haemorrhage a few hours after admission; clots the following day, haemorrhage on the 30th, Adrenalin then given; haemorrhage shortly after this, adrenalin repeated; haemorrhage again in about ~~a few~~ four hours; adrenalin then given three hourly; haemorrhage apparently controlled until, by mistake, adrenalin was forgotten for four & a half hours: just before the last administration the patient collapsed &, shortly after, he passed fresh blood & presently he died, (July Ist). P-M. no blood was found in the bowel; the ulceration was very extensive.

William Steele, aet.25. Enteric Fever. Lorry-Driver.

Admitted on Aug. 12th, 1904, about the middle of the second week of the disease. Widal +. Chest normal, abdomen tender but not distended. Spleen palpable, no rose spots. Haemorrhage, copious, twice on the 17th, before adrenalin, once, in smaller quantity, after the first dose, thereafter no more haemorrhage, adrenalin being continued hourly for about forty hours. Convalescence progressing well, still, however, in hospital.

Remarks on Cases.

My chief regret is that my cases are so few in number, but, although many cases of intestinal haemorrhage occurred in the enteric wards during my term of office, with the exception of the eight cases noted here, none required special treatment, other than dietetic, with reference to the haemorrhage. So many of the cases of enteric fever, which are complicated by intestinal haemorrhage, only show this latter feature on isolated occasions towards the end of the third week; from which it is reasonable to suppose that the haemorrhage is only the accompaniment of the more or less mechanical completion of the separation of a slough from an ulcer in the intestine & is derived from a few capillaries in granulation tissue ruptured in the process. Obviously, haemorrhage from this source cannot be very copious, &, practically, it requires no

/treatment

treatment beyond keeping the bowel at rest by withholding food for a few hours. In the cases where the haemorrhage is more copious, &, more especially, where it is recurrent, it is reasonable to suppose that it is due to the necrotic process having involved the wall of a blood vessel of some size, recurrence after temporary cessation being due to the fact that the continuing extension of the necrotic process loosened the soft, unorganised, clot which acted as a plug to the vessel. My chief aim, in the selection of cases, was to select only those of this latter class, cases in which the haemorrhage seemed to be continuing &, for this reason, I did not accept, for special treatment with adrenalin, any case (except one, for which reasons will appear), until after the third considerable haemorrhage after the cessation of food. This method of selection reduced my cases to a very small number but, to a great extent, got rid of the possible error that the haemorrhage had already ceased before I stepped in with my remedy. That this fallacy was negatived is shown by the fact that in every case, with one exception, that of the man Jones, a greater or less amount of clotted blood was passed after the administration of the Adrenalin.

It is allowed (Osler) that intestinal haemorrhage in enteric fever, although it may occur in mild cases, usually occurs in cases of considerable severity; occurs in fact in that class of case in which, even without the complication death might be reasonably expected to ensue, (Statistics show

that death follows in from thirty to fifty per cent. of all cases of haemorrhage), therefore, notwithstanding the large mortality in my cases, the fact that death ensued does not negative the haemostatic value of the treatment.

The objective clinical phenomena after the administration of the drug were strikingly few; some observers have stated that a marked contraction of the artery could be felt with the fingers on the radial pulse, but, I could never satisfy myself that this occurred, &, moreover, I could not obtain sphygmographic tracings which showed the phenomenon, although in one (Bailey May 7th) this rise in peripheral arterial tension is very faintly indicated. Only in three cases was there any change at all in the character of the pulse; in two of these a slowing occurred &, in the other, although no slowing occurred, the amplitude of the beat was greatly increased.

Of subjective symptoms after the administration of the drug I am unable to record any, the patients all stated that they felt no change of any kind.

With regard to the efficacy of the drug as a haemostatic, I feel I have proved its value in certain cases,. I believe that much must depend on the tone of the muscular tissue in the vessel walls, & it is probable that, the better the tone of the general muscular system of the subject the better will be the tone of the vessel walls; much also must depend on the size of the vessel from which the haemorrhage comes, the drug

having been proved experimentally, by Oliver & Schafer,[44] to exert its greatest action on the smaller vessels of the splanchnic area. I consider, therefore, that the drug should be more efficacious in those cases in which the patient is fairly well developed & the haemorrhage from a vessel not of the largest. That this contention is correct is well seen in comparing the cases of the four men, Brewerton, Kay, Todd, & Steele, of whom the first was very muscular & well developed & the last two were so to an average extent; the other was a man of poor physique & seemed to have been more or less badly fed all his life. In the case of the man Brewerton, a very well developed man, the haemorrhage varied between "slight amounts" (less than Oz1) & Oz12, on one occasion reaching Ø Oz24; presumably a vessel of no very large size was affected, the larger haemorrhage occurring shortly after the patient had escaped out of bed. After one administration of adrenalin there was no more haemorrhage. The patient Kay was a badly nourished man of poor physique & the haemorrhage was in larger quantities, varying between Oz8 & Oz24, presumably from a larger vessel. Adrenalin in his case was a failure, but so also were the other drugs used. Looking back on this case in the light of subsequent experience I am forced to consider what effect regular, repeated, doses of the drug would have had, but, remembering the poor muscular tone of the patient, I do not think the result would have been different.

Regarding the third case I mentioned, that of the man Todd; he was averagely well developed & the haemorrhage, being in amounts varying between Oz7 &Oz20, was presumably from a vessel of somewhat similar size to that in the preceding case. In this case, although one administration did not check it, the haemorrhage was controlled for a matter of fifteen hours by repeated, three hourly, administrations, only recommencing-- & with fatal effect-- after the adrenalin had been omitted. The recommencement of the haemorrhage at that particular time may have been, of course, a mere coincidence, but, if so, was one curiously appropriate. The last case, that of the man Steele, a well developed man, was, I think, the most satisfactory of the series. The man came into hospital very ill but apparently making a good fight for life. The haemorrhage commenced on the fifth day of residence, being passed in amounts of Oz20, Oz20, & Oz12; after the first haemorrhage morphia was given but,after the second, adrenalin was commenced as it was not thought advisable, considering the large quantities of blood lost on both occasions, to await a third haemorrhage before commencing treatment; that the haemorrhage was continuing was shown by the appearance of a further quantity later on. Here again the first administration did not stop the haemorrhage but after the hourly administration of the drug was commenced no more fresh blood was passed, although clots were present in the two subsequent stools. The treatment was

pursued for a matter of forty hours from the time at which it was commenced, that is to say, the drug was continued until four hours after a motion which contained no blood clots had been passed. In the present state of our knowledge the limit of time had to be fixed more or less empirically & I fixed a limit of four hours after a motion which contained no blood clots, in any case the administration to continue for at least twenty four hours from the time at which the last fresh blood was passed.

In all my cases I gave the drug hypodermically but, as might be expected, the continual prick of the needle was unpleasant & irksome to the patient. Even after I had read Oliver & Schafer's papers, in which they state that an artificial gastric juice has no effect on the activity of the active principle of the suprarenal glands, I continued the hypodermic administration of the drug; this I did as I considered, that if the method of administration were the same throughout the series, the comparison of the results would be the more correct. It is, however, possible that the desired result may be obtained from the oral administration of the drug &, in a future series, I hope to be able to test this.

Conclusions.

The conclusions at which I have arrived are, therefore, as follows,

1/ From my clinical experience of the drug.

Intestinal haemorrhage in typhoid fever is checked if,

1/ the patient is fairly well developed muscularly,

2/ the vessel from which the haemorrhage occurs is not one of large size.

The first qualification is, however, by far the more important.

The cardiac failure & collapse consequent on the haemorrhage is mitigated & decreased by the administration, the pulse improving in strength & tone &, in some cases, the facial colour also improving.

The drug has no appreciable clinical effect on respiration.

No bad effects are discernible after administration.

2/ From my experimental physiological work with the drug.

This work was confined to an investigation of the action of the drug on peristalsis, & shows that peristalsis is, in the large majority of cases, completely stopped & in those cases, where it is not stopped, it is diminished very materially.

Unless otherwise stated the following have been consulted in their original papers.

1, Abel, Johns Hopkins Hosp. Bulletin, 1898 IX P215, ibid. 1901 XII P80 & P337; ibid. XIII P29; Zeits. f. phys. Chemie 1899 XXVIII P318.

2. Abel &Crawford, Johns Hopkins Hosp. Bulletin, 1897 VIII P151.

3. Abelous & Langlois, "Note sur les fonctions des capsules surrenales etc.", C.R. Soc. de Biol. 1891 P792; "Destruction des capsules surrenales chez le cobaye," ibid. 1892 P388: "Recherches experimentales sur les fonctions des capsules surrenales de la grenouille", Arch. de Physiol. 1892 P269; "Sur les fonctions des capsules surrenales", ibid. P465.

4. Addison, On the constitutional & local effects of disease of the suprarenal capsules: New Sydenham Soc. 1868 P211

5. Aldrich, Amer. Jour. of Phys. 1901 V P457.

6. Aran, "Observation d'absces tuberculeux du pancreas", Arch. gener. de med. Sept. 1846 P61 cited by Friedreich in Von Ziemssen's Cyclopaedia of Medicine Vol.VIII P578.

7. Averbeck, cited by Merkel in Von Ziemsson's Cyclop. of Med. Vol. VIII P639.

8. Barker, "Some improvements in the method of local analgesia", Lancet, 1903 Vol. 2 P203.

9. Barr, Brit. Med. Jour. VOL. I P649. 1904.

10. Bates, Internat. Med. Mag. Vol. IX P881.

11. Benedict, "Suprarenal extract & adrenalin in internal medicine", Therapeutic Gazette Oct. 1901 P664.

12. Bird, Brit. Med. Jour. Vol. I 1904.

13. Blair, "Profuse haemorrhage treated by adrenalin", Brit. Med. Jour. Vol.II 1902 P975.

14. Bowen, Brit. Med. Jour. Vol. I 1904 P781.

15. Braun, Epitome Brit. Med. Jour. Vol.I 1904 P51.

16. Brown-Sequard, "Recherches experimentales sur la physiol. et la pathologie des capsules surrenales", Arch. gener. de med. Vol.2 Paris 1856 PP385& 572; "Influence de l'extrait aqueux de caps. surren. sur des cobayes", C.R. Soc. de Biol. 1892 P385; "Influence heureuse de la transfusion de sang", ibid. 1893 P448.

17. Burke, Brit. Med. Jour. Vol.I 1904 P1312.

18. Burnet, Med. Times & Hosp. Gaz. May 30,1903 P337; ibid. June 20,1903 P385.

19. Duncanson, Brit. Med. Jour. Vol.I 1904 P603.

20. Elsberg, "Some remarks on the use of adrenalin as an addition to solution for local anaesthesia", Am. Med. Mar/ 1 1902.

21. Fliener, "Ueber den heutigen Stand der Lehre von der Addison'schen Krankheit", Volkmann's Vortrage, Leipzig 1892, Innere Medicin No.13, P364.

22. Foa & Pellacani, Arch. per le scienze med. 1879 Bd.III & 1883, Bd.VII.

23. Von Furth, Zeits. f. phys. Chemie, 1898 XXIV P142; ibid. 1898 XXVI P15; ibid. 1900 XXIX P105.

24. Gottlieb, "Ueber die Wirkung der Nebennierenextracte etc", Arch. f. exper. Pathol. & Pharmakol. 1896 XXXVIII P99.

25. Gualdrini, Epitome Brit. Med. Jour. Vol.I 1904 P50.

26. Guarnieri & Marino Zucco, "Experimentelle Untersuchungen uber die toxische Wirkung des wasserigen Extractes der Nebennieren", Chem. Centralbl. 1888. cited by Nothnagel.

27. Graeser, Munch. Med. Woch. July 28 1903, cited in Med. Review Nov. 1903,P681.

28. Harrison, Brit. Med. Jour. Vol.I, 1904, P429.

29. Hartmann, Die Krankheiten des Ohres etc. P249, cited by Burnet, in Med. Times & Hosp. Gaz. 1903 P387.

30. Hedley, Brit. Med. Jour. Vol.I, 1904 P365.

31. Holt, cited by Burnet, loc. cit..

32. Jakoby, "Beitrage zur physiologischen und pharmakologischen Kenntniss der Darmbewegungen mit besonderer Berucksichtigung der Beziehung der Nebenniere zu denselben." Arch. f. exper. Pathol. & Pharmakol. 1892 Bd.XXIX P171.

33. Kahlden, "Beitrage zur pathol. Anat. der Addison'sche Krankheit", Virchow's Arch. f. pathol. Anat. Berlin 1888, P65.

34. Langlois, "Destruction des capsules surrenales chez le chien", Arch. de Physiol. 1893, Ser.V Vol.V P488.

35. M'Donald, Brit. Med. Jour. Vol.I, 1904, P1246.

36. M'Donough, "Suprarenal extract as a haemostatic", Brit. Med. Jour. Vol.I 1902 Mar. 15.

37. M'Kenzie, "Suprarenal extract in the epistaxis of Haemophilia", Brit. Med. Jour. Vol.I 1901 P1009.

38. M'Kernon, The treatment of chronic purulent inflammation of the middle ear" Post Graduate Nov. 1901.P1011.

39. Meltzer & Auer, Epitome Brit. Med. Jour. Vol.II, 1904-P3.

40. Miles & Muhlberg, Cleveland Med. Jour. Dec. 1902, cited by Burnet loc. cit..

41. Moore, Jour. of Physiol. 1897, XXI. P382.

42. Myrtle, Brit. Med. Jour. Vol.I, 1904, P1099.

43. Nothnagel, "Experimentelle Untersuchungen uber die Addison'sche Krankheit", Zeitsz f. klin. Med. 1879-1880, Bd.I, P77. "Zur Pathologie des Morb. Addisonii", ibid. 1885, Bd.IX, P195.

44. Oliver & Schafer, Proceed. of the Physiol. Soc. 1894 &'95. Jour. of Physiol. 1895, Vol.XVIII.

45. Redmond, Brit. Med. Jour. Feb. 27 1904, P489.

46. Reynolds, "The therapeutic value of Adrenalin Chloride", Am. Med. July 6, 1901,P32.

47. Semmola, "De la pathogenie nerveuse de la maladie d'Addison", Gazette hebdomad. de med. & de chir. 1881 P540.

48. Stilling, "Ueber die compensatorische Hypertrophie der Nebennieren", Virchow's Archiv. 1889, Bd.CXVIII P569.

49. Solis-Cohen, "The treatment of Hay Fever", Am. Med. Sept.7, 1901, P376.

50. Szymonowicz, "Die Function der Nebenniere", Pfluger's Arch. 1896, Bd. LXIV, Heft 3-4. P97.

51. Strehl & Weiss, "Beitrage zur Physiologie der Nebenniere", Pfluger's Arch. 1901 Bd. LXXXVI, P107.

52. Simmonds, "Ueber compensatorische Hypertrophie der Nebenniere", Virch. Arch. 1898 Vol.CLIII P138.

53. Takamine, Therapeutic Gazette 1901, V, P457.

54. Tizzoni, "Ueber die Wirkungen der Exstirpation der Nebennieren auf Kaninchen", Ziegler's Beitrage z. path. Anat. 1889, Bd.VI, P1.